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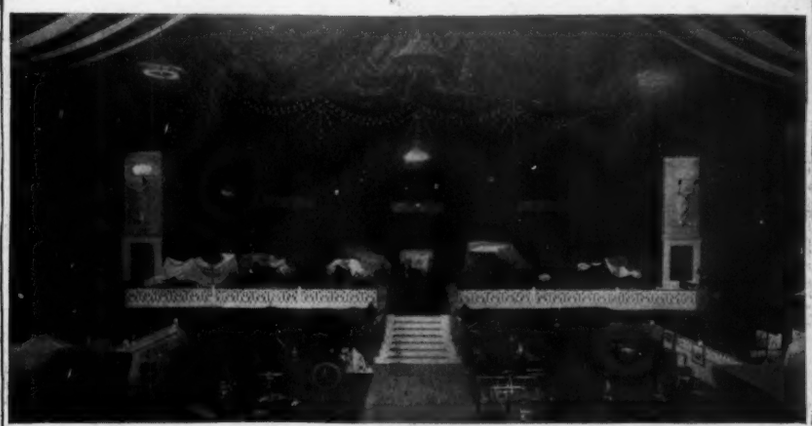
MOTOR AGE

NEW ENGLAND SHOW A WONDER OF ITS KIND

Boston Scores Another Success, Attracting Nearly 270 Exhibitors of Cars and Sundries



BOSTON, MASS., March 6.—For 2 hours this evening thousands of people maneuvered through Mechanics' building as best they might, trying to get some idea of what they had entered the place for, and after edging, squeezing, jostling and squirming they sought the exits, all the time finding motor cars and their accessories staring at them from whatever angle they moved. Thus was the Boston motor show ushered in. It was the same old story as to crowds. From nightfall until the doors were opened the people began swarming up to the doors like troops for a parade, taking the best places available and then at 8 o'clock surging indoors.

At first it was like the breaking of a dam. Into the hall the mighty human current streamed. After a while it became thinner as the great throngs trickled into the spaces for the exhibits. Later on it grew large and swollen again as hundreds more poured into the place. And everyone must have been impressed with the beauty of the show. The decorative effects were certainly the equal of any used in previous years, and it would not be saying too much to state that other shows were excelled.

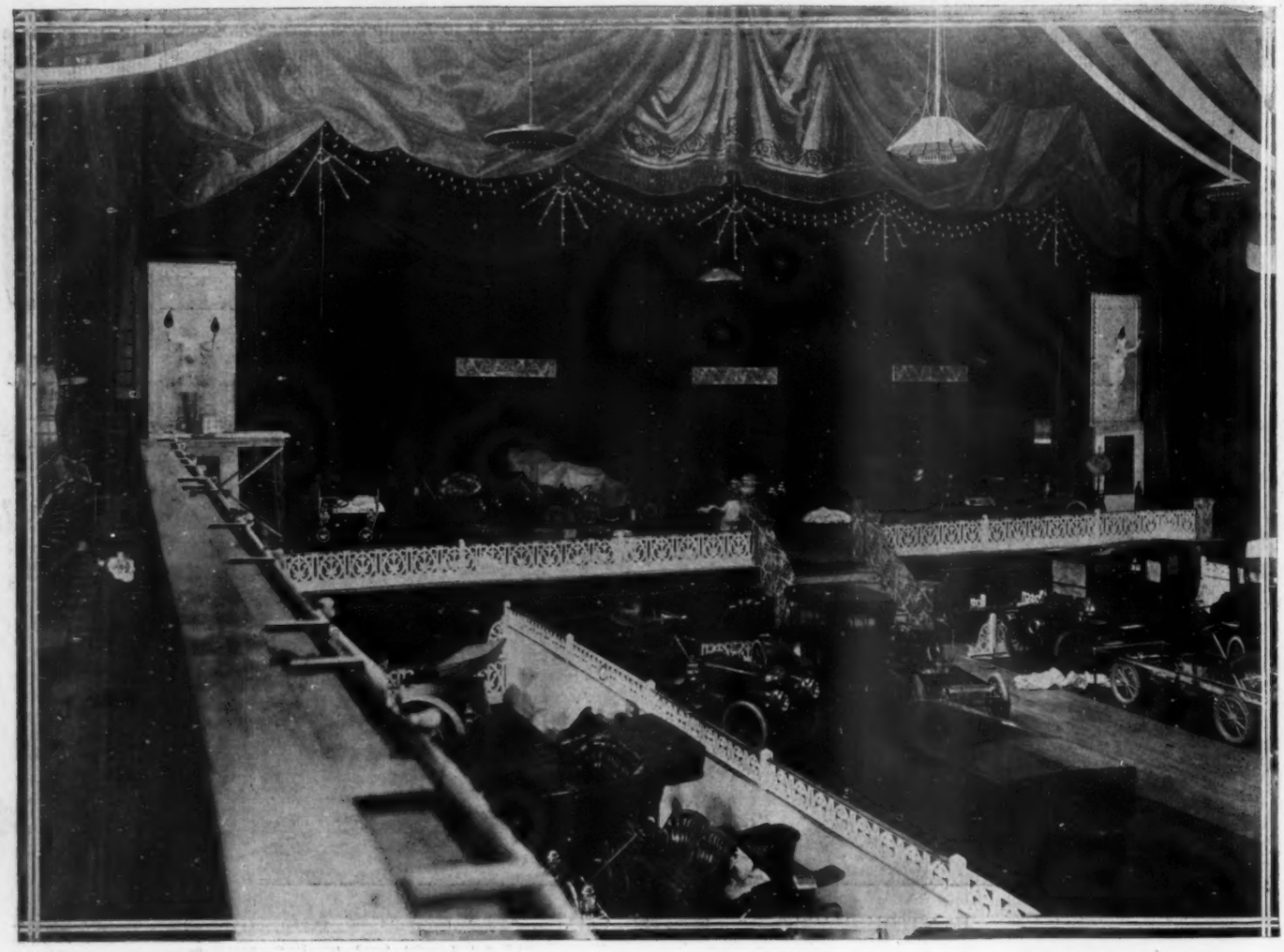
The decorator has waved his magic wand and weaved some beautiful effects. On entering the triangle of exhibition hall it seems like a mammoth fan opened out, on which are beautiful designs in raised figures.

It is a hall of arches. Green and white and gold blend nicely in the major scheme, while red, white and orange give the minor tints. Massive columns of green onyx tower on either side of the aisles. From top to top in graceful curves stretch the arches. Dainty figures rest easily at the corners of each arch, while from underneath there glows a soft, subdued light, giving the right tint to create harmony.

Through the arches one is drawn irresistibly to Grand hall. The absence of arches and columns there is in striking contrast to the place just left behind. One feels as if he were transported to another realm, like swinging from a village out into the open country. Nevertheless beauty lingers here, too.

On either side of the stage are two figures, each holding torches. They represent "Genii of Progress." From the torches are whirled shafts of light, which, shooting out like the waves of wireless telegraphy, strike the polished bodies of the cars, glancing therefrom to be lost in the world of the invisible. There is a fringe of lights swinging down above the stage to accentuate the effect. It is indeed a bower of beauty.

Boston's show occupies a rather unique position in the motor industry. It is one of three big exhibitions and therefore is regarded as in the same class as New York and Chicago from the standpoint of the makers. It is more of a retail show than the ones in the other two cities, however. For example, New York draws people from all over the country to its shows because the metropolis is such a vacation resort. But the sales are mostly local be-



FROM THE GALLERY, LOOKING DOWN ONTO THE MAIN FLOOR OF THE BUILDING

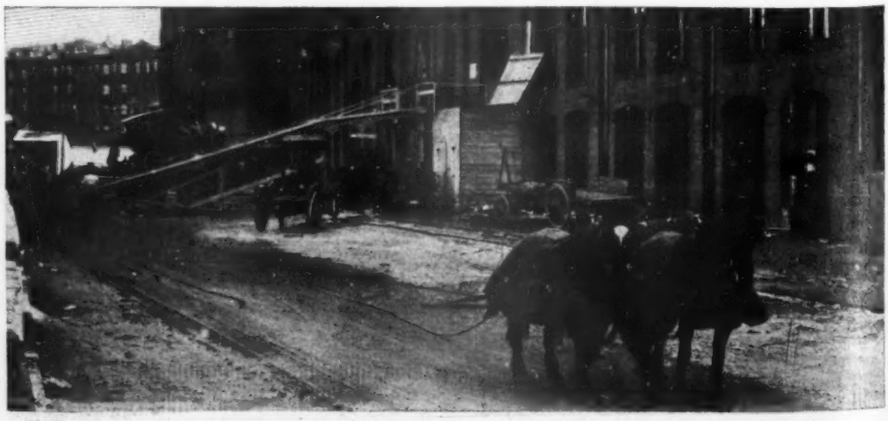
cause of competition near at hand. Chicago attracts people from the middle west. In fact a circle might be drawn with that city in the center and extending say 500 miles in any direction, and outside of the men who go to shows to work, it is doubtful if the visitors beyond the circumference really amount to very much.

Now take New England. We all know from seeing numerous plays that the New Englander looks upon a visit to Boston as a rare treat. It may be exaggerated somewhat in the dramas, but it is based upon real foundation. This does not apply to farmers, either. It is surprising what may be found in some of the out-of-the-way places in New England in the way of public and professional life, and the men interested in their municipalities do not get to Boston so very often.

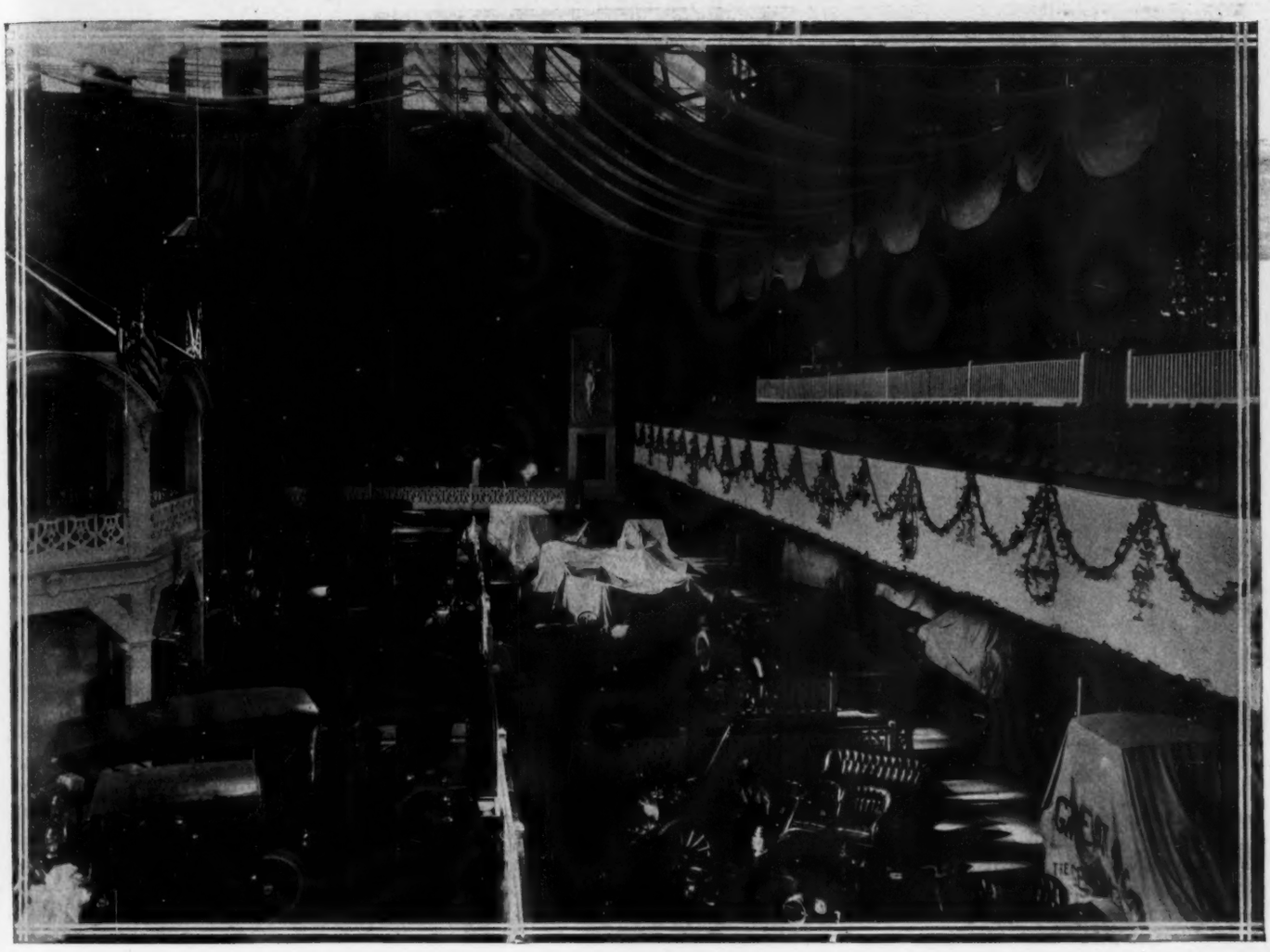
Show Attracts Many

There is one time of the year, however, that gets many men going and that is spring. A sort of wanderlust gets into their veins and then it is that they begin to study the time tables and figure out what there is worth seeing in Boston. During the last few years the motor show has been the magnet. So into town they come and they wander about at the show, but theirs is not an aimless wandering. These men are purchasers. True, there are local agents in their own places, maybe, and they have talked over the probable purchase of a car, but there is that traditional characteristic of New Englanders engendered for generations that holds them back—the cautious preparations before parting with their money. Long before any Missourian ever thought of originating the slang about wanting to be shown, New Englanders had been putting the plan into practice.

Therefore when they get to the show they go over the cars very carefully before making a choice. They are not worried about the talk they hear about late deliveries unless they order early, for here again nature has provided for this contingency, in a measure. In some of the outlying sections of the different states the roads are in very bad shape until the July sun has baked the moisture of winter snows and spring rains out of them, and if they had cars they could not use them so very much and get real pleasure out of them. So they can wait.



CARS BEING TOWED UP INCLINE INTO HALL



LOOKING DOWN ONE SIDE OF THE MAIN HALL IN THE BIG SHOW BUILDING

The New England agents realize this condition of affairs now and so they come to Boston in droves just before the show. They have prospective customers singled out and are ready to go ahead when the men come to Boston. And these men, by the way, are mostly ready to keep any bargain they may make so the dealer can generally figure out just what ones may become real purchasers. This of course takes the burden off the Boston dealers, who are looking after their own sales. It has now reached that stage that the Boston show has become really a New England exhibition, for the men with the popular cars book their orders very early from their Boston customers, and then sit back to await the outlying districts. Many of the Boston people who buy cars, at least the high-priced ones, go to the shows at New York.

What It Means to Dealers

Here is an example of what the show means to the dealers. The Motor Age writer spent a few days at one of the most northern towns in New Hampshire a little more than a year ago. When the Boston show was held last year an attorney, a baker, a physician and a hotel man from that little town came to Boston and each of those four men ordered a car before they left. They all purchased different makes, and one of the men said that there were at least three more men on the way for the same purpose. They could have gone to Portland and ordered their cars but they would rather have a brief vacation in Boston and see the big show. That is a sample of why business is good here.

MECHANIC'S HALL, IN WHICH BOSTON SHOW IS BEING HELD

Topographically New England states have many advantages over some of her sister states and this helps wonderfully in the sale of cars. Maine is a great hunting region in the fall, while all summer her beautiful lakes are the mecca of thousands. In addition to this she has splendid seashore resorts. The rich people go there in swarms and the residents like to look at these people of wealth. So the latter go visiting the former, and as the roads are now becoming better than ever, hundreds of cars are being sold every year in the Pine Tree state. There will eventually be a road through there to Quebec, in fact there is a good one now that goes through the heart of the woods,

GENERAL VIEW OF THE BOSTON SHOW, WITH BAND STAND IN FOREGROUND

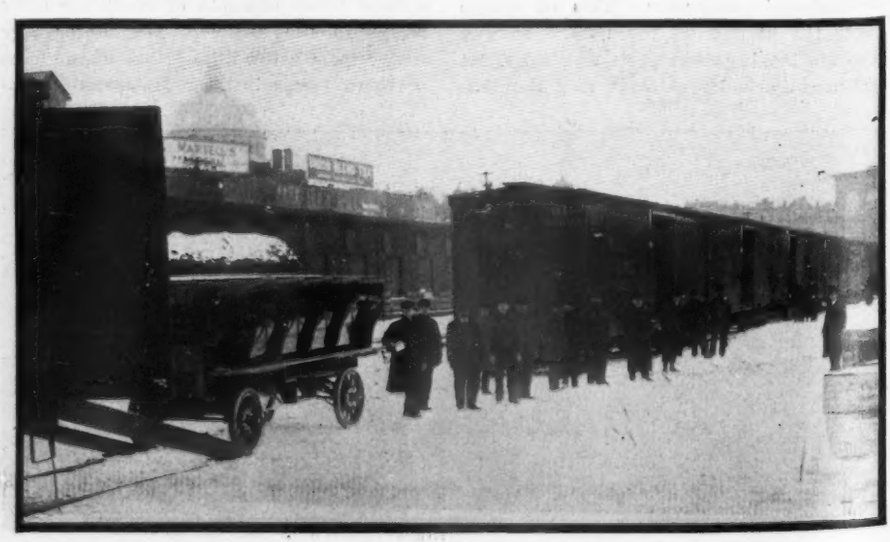
as the Glidden tourists discovered. Maine has a show every year in Portland, and it is a very good one, but it does not in any way dim the luster of the Boston one. There are live agents in Portland, Bangor, Augusta, Lewiston, Waterville and other cities, and the legislature has not passed any inimical laws to restrict motoring, but has rather aided by making highway appropriations.

New Hampshire Attractive

New Hampshire is the Switzerland of America, for it has its lakes and mountains, and a bit of seashore, too. It is not a long run from there down to Massachusetts to take advantage of the fine Bay State roads, and the state lawmakers, perceiving what an immense amount of money the motorists are scattering in their domains each year are more than meeting them half way. The laws are easy and more work is being done toward systematic highways connecting with Massachusetts and Maine roads than many are aware of. So from that state there is always a big throng at the show. Concord, Nashua, Manchester, Dover, Portsmouth, Rochester, in fact all the large cities of the state are near the Bay State line—the farthest being only 2 hours ride from Boston, and each one has its several agents who do a good business. Further up the state are thriving towns where cars are becoming more numerous each year.

Vermont does not send such a great representation to Boston, but there are enough to make a respectable showing. The new law just passed taxing cars according to horsepower is going to retard the sale of cars there. From Rhode Island there is always a big number at the Boston show, and there will be more than ever this year, for there is to be no exhibition at Providence. It is but 1 hour's ride to Boston from the capital city, and all the papers there have spaces at the Boston show as they recognize its value. That means more sales. Connecticut is in the same class as Vermont, on the outskirts and some of its larger cities are near enough to be taken within the domain of the New York exhibitions.

Massachusetts is mentioned last for there are two elements to be considered. From the state in general the Boston show draws a heavy tribute as the greater part of the population is within the eastern half. Nearing the Atlantic ocean this population becomes denser and so within a radius of Boston, say of 10 or 12 miles, there are some 2,500,000 people to draw from. In this respect Boston outdoes some of the other cities that lead her in population, for their outskirts comprise wide areas with few people while populous cities, such as Cambridge with about 100,000; Somerville, nearly the same; Chelsea, 60,000, and a dozen others of equal size are all connected with Boston by trolleys charging but 5 cents. Then again the splendid roads in Massachusetts are so tempting that this alone helps sales,



UNLOADING SIX CARLOADS OF RAPID TRUCKS

and when one considers that within a day's ride are mountains, seashore and lakes the man who can afford a motor car and who has not one must be very much afraid of the machines or his money.

That is why the Boston show is so successful. The month of March is the right time; Boston has a splendid building for its show, and the Boston dealers' association is one of the best organizations of its kind in existence.

A tour about the show revealed the fact that there are eighty-two makes of cars actually represented by machines. These cars made a total of 275 vehicles. The touring cars outnumber all the others, as was expected, there being just 100 of them. The roadsters, however, are very much in evidence this year with sixty-three and the smaller runabouts number twenty-nine. There are thirty-five chassis displayed. Limousines are not so numerous, as only sixteen are to be seen, and there are nine landaulets. There are ten town cars, eleven electrics and one coach.

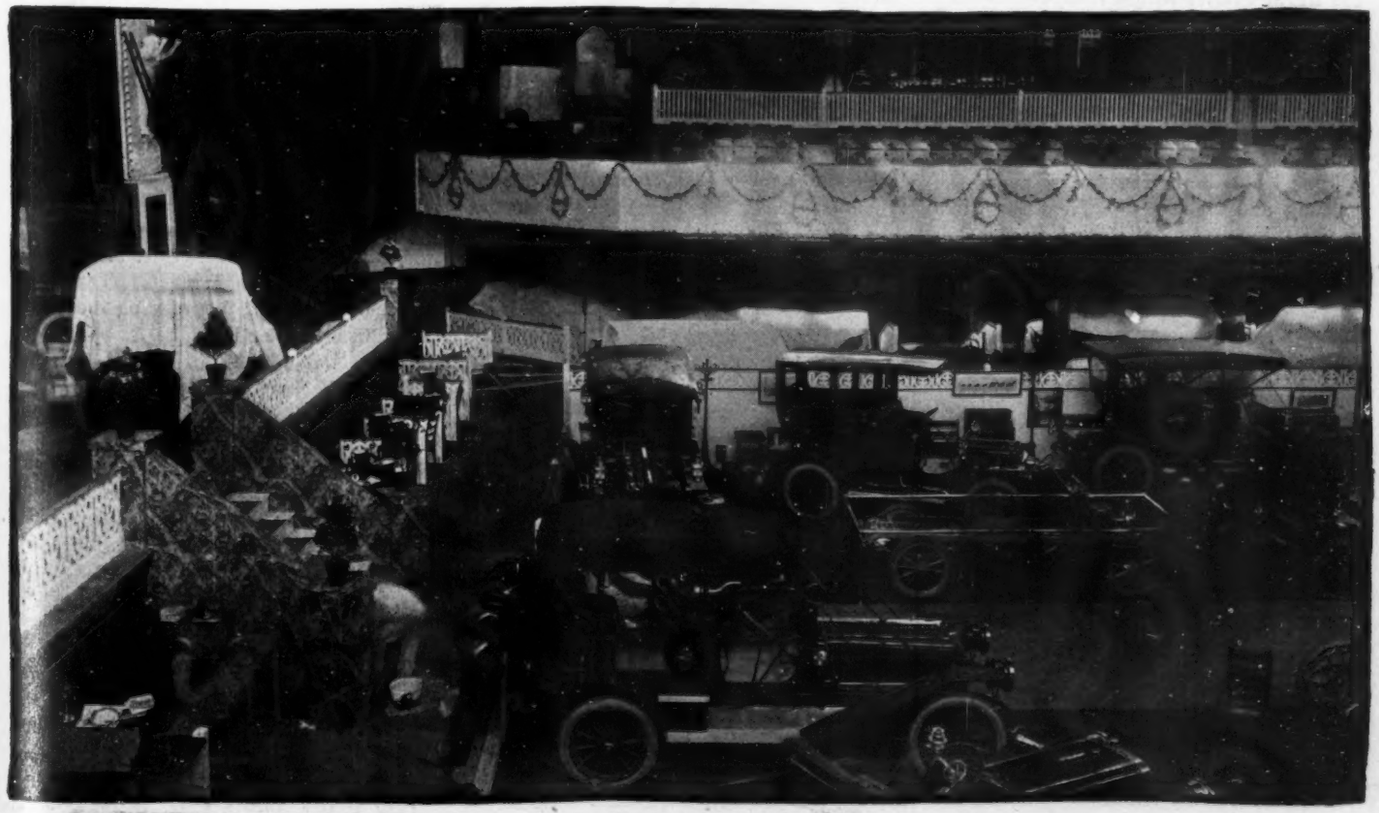
There are fifteen makes of commercial vehicles represented. Their exhibits comprise twenty-two trucks, sixteen wagon, two buses and two sightseeing wagons. There are sixteen makes of motor cycles with sixty-four machines also in the show. The tire men are represented by twenty-five firms, and there are 125 accessory exhibitors. This makes a total of 263 exhibitors, but with a few more to get in during the week the figures will run up to 270. These are bona fide exhibitors, for such things as newspapers and trade publications are not counted, and unlike some show figures given out, the firm name is not counted as one and the make of the car shown as another, thus doubling up. And all these are in one building, and they take up something like 100,000 square feet of space. As to the value of the show, that is more guesswork.

SPECIAL EXHIBIT MADE BY THE PACKARD COMPANY

Where Cars are Located

The same well-known firms are in the same places in many instances as heretofore, and it is like visiting old acquaintances. In the grand hall, which is square-shaped, the stage is occupied by Alvan T. Fuller, who has a complete line of Packards and Cadillacs. The main aisle is divided into five spaces. Fronting the aisle and also facing the stage are the White and the Winton. The White company has its steamers in touring car, roadster and limousine types arranged admirably and with the Winton sixes across the way in varied hues, with opened and closed cars, it makes a fitting centerpiece.

Then comes the Peerless on the right leaving the stage. Limousines and landaulets, with touring cars and roadsters, fill up the space occupied by the Peerless representatives. Across the way the Autocars and Appersons have part of the space left and the Regal and Pennsylvania divide the other. Backing up on these spaces are others making more divided squares. There is the Pierce-Arrow at the northeast corner, where it



BIRDSEYE VIEW OF THE STAGE, BALCONY AND MAIN FLOOR

VIEW WHICH GIVES GENERAL IDEA OF THE BOSTON SHOW

always has been and with three doors leading to it. There is not a car in the space that is not sold. It is a comprehensive line, too, luxury and comfort typified in the closed cars and speed and strength, too, but more pronounced in the open cars. There is a chassis shown. The Knox has the space on the northwest where roadsters, touring cars and runabouts make up the exhibit. Swinging about to the southwest, there is the Royal Tourist with a runabout, touring car and a chassis, and next to that comes the Stevens-Duryea with its big and little sixes in admirable designs. The Stoddard-Dayton and American Locomotive split the southeast space, each showing a chassis and touring cars and runabouts.

That leaves only the spaces under the balcony and right across from the Stoddard-Dayton the E-M-F and Studebaker cars have their space. There are chassis in both and a roadster and touring car for each. Next comes the Mitchell with two touring cars and a roadster. Stanley steamers take up the balance of that side with three touring cars and a roadster. On the opposite side the Franklin, Jackson, American and Kisselkar divide the long stretch from door to stage.

In the Hall of Arches

Out in the hall of arches, which is triangular, there are many more. Entering through the main door there is a long, straight aisle to the grand hall, and this is considered the choice section for spaces. The Fiat people have the first one on the left where they have a rather complete line. Next comes the Lancia. This make displays a roadster, town car and golf car with the Lampo that won at Savannah. Then one finds the Locomobile with the big Vanderbilt racer staring right from the edge of the space.

On the same side there comes the Chalmers-Detroit, which shows roadsters and touring cars, and chassis, and beyond is the Thomas with roadsters, flyabout and touring cars. The Rambler is the last on the side, and it has six cars of different styles and a chassis. The first exhibit on the right is the Bailey electric with two cars and then the Maxwell with one of each of its models, but no chassis. The Ford presents five cars, three closed and two open, and the National next to it has three touring cars. The Marmon presents three cars and then one finds the Stearns with large and small models and a chassis. The Columbia shows a touring car and an electric. That finishes the aisle. Along the other aisle there comes the Oldsmobile with roadsters and touring cars showing in all six cars. The Buick has two touring cars, two roadsters and two runabouts. The Reo, Overland and Premier are also on this aisle and each has three models on view. In this same section of the building the Velie, Inter-State, Acme, Renault, Brush, Allen-Kingston, Baker, Speedwell, Midland, Lane, Atlas and Packard also have sections.

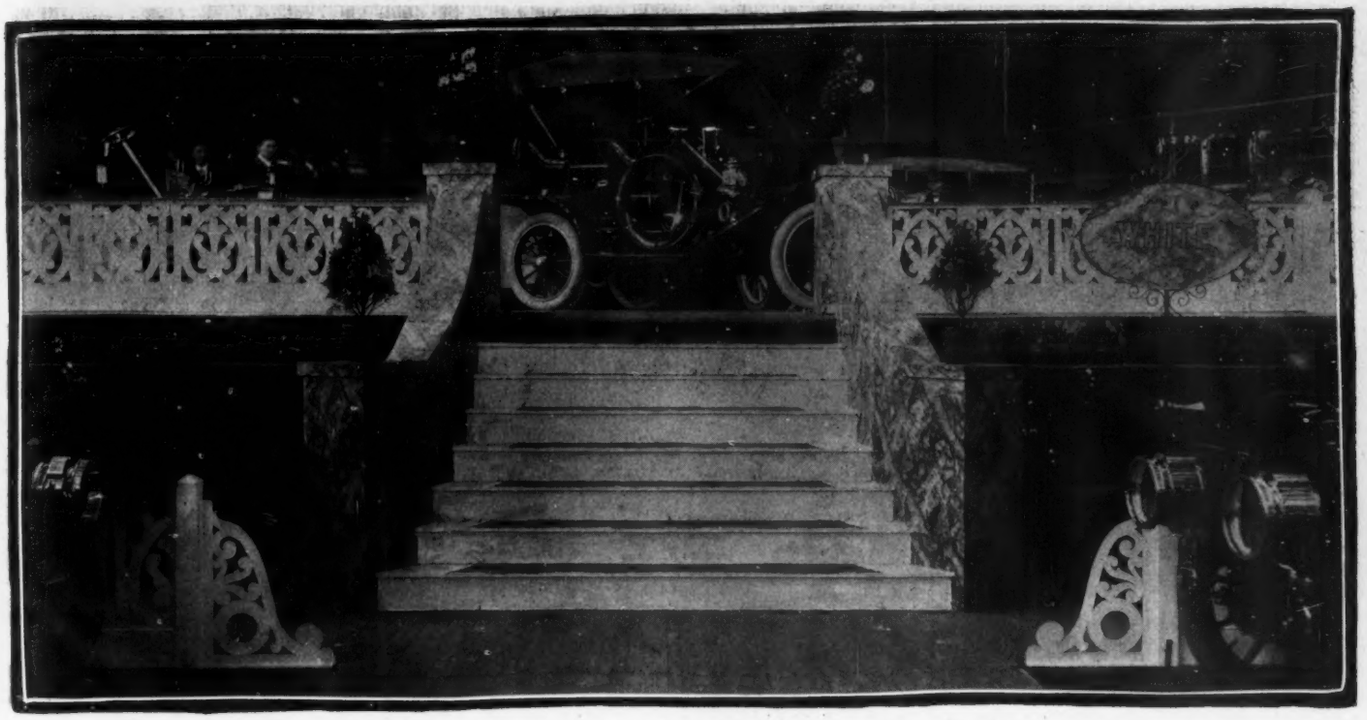
Along the rear wall the Matheson, Grout, Hupmobile, Panhard, Pope-Hartford and Austin have their exhibits. That completes this section. Upstairs in Talbot hall the Welch, Herreshoff, Napier, Pullman, Glide and Waverley electrics have the place to themselves. Downstairs there are the Pierce-Racine, Schacht, De Luxe, Zust, McCue Jewel, Holsman, American Simplex, Lambert, Elmore and Detroit electric.

UNIQUE BODY DESIGN ON ONE OF THE WELCH CARS

List of Exhibitors

MOTOR CARS

Alvin T. Fuller, Boston—Packard, Cadillac.
George J. Dunham, Boston—Royal Tourist.
Winton Motor Carriage Co., Boston—Winton.
White Co., Boston, White.
Reed-Underhill Co., Boston—Knox.
Park Square Auto Station, Boston—American Locomotive, Stoddard-Dayton.



ORNAMENTAL STEPS AND RAILING ON STAGE WHERE CARS ARE SHOWN

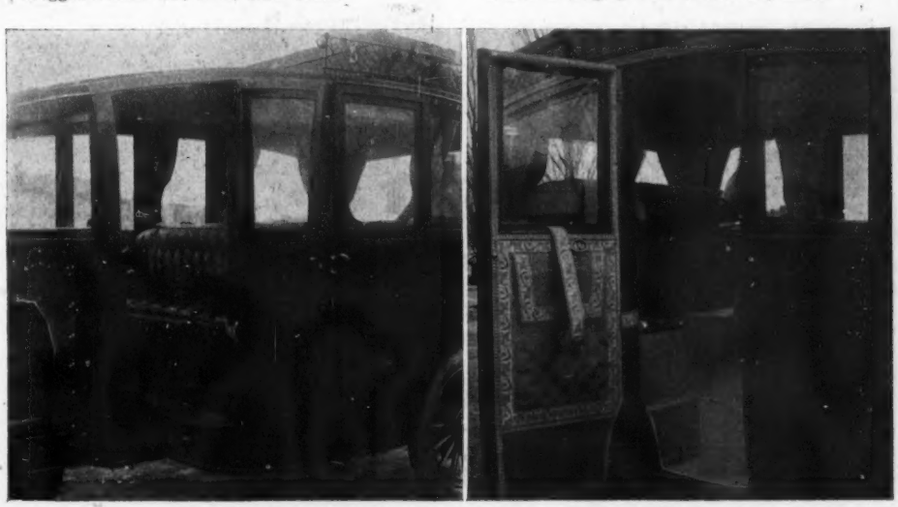
Peerless Motor Co., Boston—Peerless.
George H. Lowe, Boston, Gyroscope, Regal, Pennsylvania.
J. W. Maguire Co., Boston—Pierce-Arrow.
Fred S. Smith, Boston—Autocar, Apperson, Oakland.
Stanley Motor Carriage Co., Newton, Mass.—Stanley.
W. M. Jenkins & Co., Boston—Mitchell.
Studebaker Brothers of New York, Boston—Studebaker, E-M-F.
Oakland Motor Car Co., Buffalo—Oakland.
Franklin Automobile Co., Boston—Franklin.
American Auto Co., Boston—American.
J. W. Bowman & Co., Boston—Stevens-Duryea.
Jackson Automobile Co., Jackson, Mich.—Jackson.
Kissel Kar Co., Boston—De Luxe, Kisselkar.
Welch Motor Car Co., Boston—Welch.
Henry F. Farrow, Boston—Grout.
Dodge Motor Vehicle Co., Boston—Pope-Hartford, Waverley.
Panhard & Levassor, Boston—Panhard.
Thomas B. Jeffery & Co., Boston—Rambler.
Whitten-Gilmore Co., Boston—Thomas, Chalmers-Detroit.
Locomobile Co. of America, Boston—Locomobile.
Hol-Tan Co., Boston—Lancia.
S. R. Bailey & Co., Inc., Amesbury, Mass.—Bailey.
Maxwell-Briscoe-Boston Co., Boston—Maxwell.
Ford Motor Co., Boston—Ford.
Linscott Motor Co., Boston—Reo, National, Overland.
F. E. Wing, Boston—Marmon.
S. M. Supply Co., Boston—Inter-State.
General Auto Co., Boston—Holsman.
J. H. McAlman, Boston—Columbia.
Palmer & Singer, New York—Palmer-Singer, Simplex.
Algonquin Motor Car Co., Boston—Oldsmobile, Columbus electric.
Premier Boston Depot, Boston—Premier.
Boston Motor Co., Boston—Acme.
Buick Motor Co., Boston—Buick.
Curtis-Hawkins Co., Boston — Speedwell, Chadwick.
C. H. Pixley Co., Boston—Pixley.
South End Motor Car Co., Boston—Brush, Atlas.
Stanley Webster Co., Boston—Pittsburg.
A. F. Neale, Boston—Baker.
Charles A. Eaton, Boston—Lambert.
Anderson Carriage Co., Detroit, Mich.—Detroit electric.
General Vehicle Co., Boston—Commercial trucks.
Butler Motor Car Co., Boston—Rapid.
Schacht Mfg. Co., Cincinnati, O.—Schacht.
Jewel Motor Car Co., Massillon, O.—Jewel.
Alden Sampson Mfg. Co., Pittsfield, Mass.—Sampson.
Auto Car Equipment Co., Buffalo, N. Y.—Commercial trucks.
Gramm-Logan Motor Car Co., Bowling Green, O.—Gramm-Logan.
D. P. Nichols & Co., Boston—Frayer-Miller.
Chase Motor Truck Co., Syracuse, N. Y.—Chase.
McCue Co., Hartford, Conn.—McCue.
American Simplex Co. of Boston, Boston—Simplex.
Crown Motor Car Co., Boston—Glide.

MOTOR CYCLES

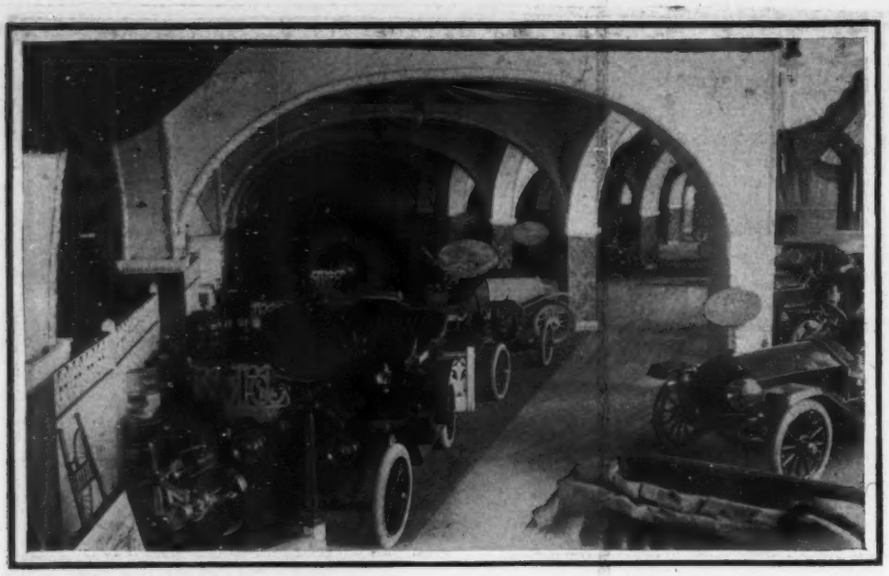
Consolidated Mfg. Co., Toledo, O.—Yale.
Merkel-Light Motor Co., Pottstown, Pa.—Merkel-Light.
Ovington Motor Co., New York—F. N.
N. S. U. Motor Co., New York—N. S. U.
Excelsior Supply Co., Chicago—Excelsior.
Harley-Davidson Motor Co., Milwaukee, Wis.—Harley-Davidson.
American Motor Co., Brockton, Mass.—M. M.
Hendee Mfg. Co., Springfield, Mass.—Indian.
Crouch Motor Co., Stoneham, Mass.—Crouch.
Walton Motor Co., Lynbrook, L. I.—Midget Bi-Car.
Auto-Bi Co., Buffalo, N. Y.—Greyhound.
Aurora Automatic Machinery Co., Aurora, Ill.—Thor.
Reading-Standard Co., Reading, Pa.—R-S.
New Era Gas Engine Co., Dayton, O.—New Era.
Reliance Motor Cycle Co., Owego, N. Y.—Reliance.
Pierce Cycle Co., Buffalo, N. Y.—Pierce.
G. H. Curtiss Mfg. Co., Hammondsport, N. Y.—Curtiss.

ACCESSORIES

Worcester Pressed Steel Co., Worcester, Mass.
Nugget Polish Co., Ltd., New York.
P. A. Murray & Co., Newton, Mass.
Springfield Portable Construction Co., Springfield, Mass.
M. W. Allen & Son, Boston.
Charles W. Kidder, Stoneham, Mass.
Arthur C. Harvey Co., Boston.
Norton Grinding Co., Worcester, Mass.
Chandler & Farquhar Co., Boston.
Coates Clipper Co., Chandler St., Worcester, Mass.
Charles Waugh & Co., Cambridge, Mass.
Harriman Brothers, Boston.
Sterling Hardware Co., New York.
Twin Elm Spring Co., Lexington, Mass.
Couch & Seeley, Boston.
Teel Mfg. Co., Medford, Mass.
Compressed Air Power Co., Boston.
Columbia Tire and Top Co., Boston.
Nightingale Whistle Mfg. Co., New York.
Perfection Wrench Co., Port Chester, N. Y.
Percy Ford Co., Boston.
George A. Howe, New York.
C. J. Downing, New York.
Parker Mfg. Co., Roxbury, Mass.
Boston Auto Gage Co., Boston.
Maryland Casualty Co., Boston.
William Herbert Jones, Boston.
Auto Improvement Co., Boston.
Stromberg Motor Device Co., Boston.
W. F. Polson, Buffalo, N. Y.
Havoline Oil Co., Boston.
Boston Tire and Rubber Co., Boston.
G & J Tire Co., Indianapolis, Ind.
Dow Tire Co., New York.
C. E. Splitdorf, New York.
White & Bagley Co., Worcester, Mass.



CHAUFFEUR'S SEAT AND BATH TUB IN THE WELCH



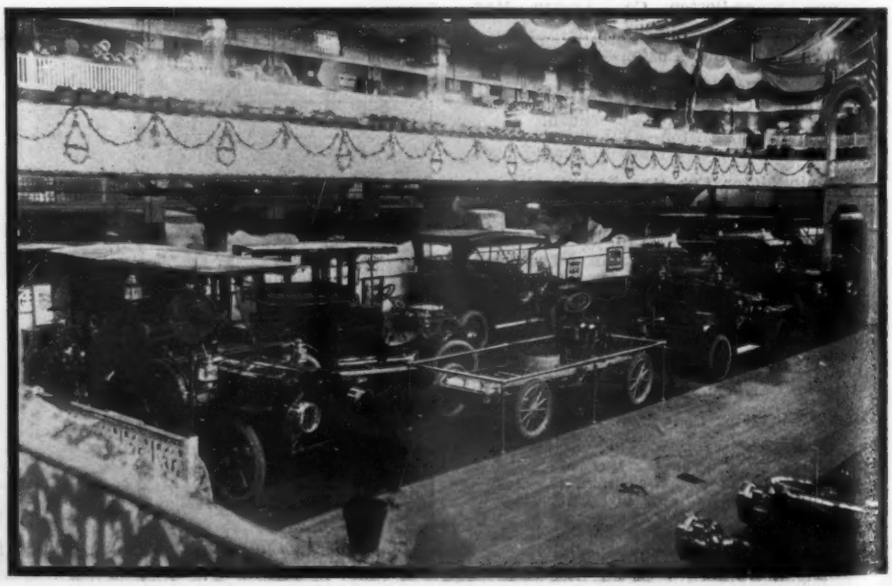
WHERE THE VELIE IS BEING DISPLAYED

Diamond Rubber Co., Akron, O.
Goss Wrench Co., Worcester, Mass.
W. J. Connell, Boston.
Post & Lester Co., Boston.
Bi-Motor Equipment Co., Boston.
Pennsylvania Rubber Co., Jeanette, Pa.
Charles E. Miller, New York.
Columbia Lubricants Co. of New York, New York.
Morgan & Wright, Detroit, Mich.
Atwood-Castle Co., Amesbury, Mass.
Fisk Rubber Co., Chicopee Falls, Mass.
Veeder Mfg. Co., Hartford, Conn.
Warner Instrument Co., Boston.
Gray & Davis, Amesbury, Mass.
S. F. Bowser & Co., Boston.
Pittsfield Spark Coil Co., Dalton, Mass.
Empire Auto Tire Co., Trenton, N. J.
T. F. Russell Co., Boston.
Edgar T. Ward & Sons, Boston.
Batavia Rubber Co., Batavia, N. Y.
Gabriel Horn Mfg. Co., Cleveland, O.
Hillman Auto Supply Co., Boston.
William J. Smith Co., New Haven, Conn.
Oliver Mfg. Co., Chicago.
Dover Stamping and Mfg. Co., Cambridge, Mass.
J. D. Coward, Boston.
Commonwealth Rubber Co., Reading, Mass.
Hume Carriage Co., Boston.
E. B. Badger & Sons Co., Boston.
Vesta Accumulator Co., Chicago.
National Carbon Co., Cleveland, O.
W. H. Leland & Co., Worcester, Mass.
Jones Speedometer Co., New York.
Firestone Tire and Rubber Co., Akron, O.
Shawmut Tire Co., Boston.
Standard Welding Co., Cleveland, O.
Continental Caoutchouc Co., New York.
National Tube Co., New York.
Leather Tire Goods Co., Newton Upper Falls, Mass.
Hoffecker Co., Boston.
Whitney Mfg. Co., Hartford, Conn.
Joseph Dixon Crucible Co., Boston.
Swinehart Clincher Tire Co., Akron, O.
Randall-Faichney Co., Boston.
J. H. Sager Co., Rochester, N. Y.
Republic Rubber Co., Youngstown, O.
Lebanon Steel Casting Co., Lebanon, Pa.
Pettingill-Andrews Co., Boston.
Michelin Tire Co., Milltown, N. J.
Hartford Suspension Co., Jersey City, N. J.
Electric Storage Battery Co., Philadelphia.
Angier Co., Boston.
Pantasote Co., New York.
J. W. Colgan Co., Boston.
Ajax-Grieb Rubber Co., Boston.
Witherbee Igniter Co., New York.
Goodyear Tire Co., Akron, O.
A. W. Harris Oil Co., Providence, R. I.
B. F. Goodrich Co., Akron, O.
William Cramp Ship and Engine Building Co., Philadelphia.
Hartford Rubber Works Co., Hartford, Conn.
New York and New Jersey Lubricants Co., New York.
Gilbert & Barker Mfg. Co., Boston.
Atwater Kent Mfg. Co., Philadelphia.
Underhay Oil Co., Boston.
Heinze Electric Co., Lowell, Mass.
Charles F. Kellom & Co., Philadelphia.
A. J. Wilkinson & Co., Boston.
F. Shirley Boyd, Boston.
Gordon Auto Supply Co., Boston.
Eastern Carbon Works, Jersey City, N. J.
Hopewell Brothers, Cambridge, Mass.
William C. Robinson & Son Co., Boston.
L. C. Chase & Co., Boston.
Vacuum Oil Co., Rochester, N. Y.
Frederick A. Goppelt, Waterbury, Conn.
Eagle Oil and Supply Co., Boston.
Walden Mfg. Co., Worcester, Mass.
Walker Lithographing Co., Boston.
Champion Ignition Co., Flint, Mich.
Winestock Mfg. Co., Perkinsville, Vt.
Voorhees Rubber Mfg. Co., Jersey City, N. J.
Thomas W. Byrne, Boston.
John A. Salman & Co., Boston.
Monitor Mfg. Co., Boston.
Allen Fire Department Supply Co., Providence, R. I.
Zeglen Bullet Proof Cloth Co., Chicago.
Moore-Smith Co., Boston.
Kilgore Mfg. Co., Boston.
American Stepney Spare Wheel Co., New York.
Empire Sales Co., New York.
Lavelette & Co., New York.
Frank L. Young & Kimball, Boston.
American Storage Battery Co., Boston.
S. J. Moran, Cambridge, Mass.
Auto Tire Inflating Co., Brooklyn, N. Y.
Knapp-Greenwood Co., Farmington, Me.
Hoyt Electrical Instrument Co., Penacook, N. H.
The Loring Auto Appliance Co., New York.
Ernest Flentje, Cambridge, Mass.
Sexton Can Co., Boston.
Walter J. Forbes, Boston.
Allen Auto Specialty Co., Boston.
Rutherford Rubber Co., Rutherford, N. J.
Atlas Rubber Co., New York.
Federal Mfg. Co., Lowell, Mass.
K. W. Ignition Co., Cleveland, O.

New Motor Cars

Several new cars make their initial appearance at the Boston show and, as is generally the case, it is around these that much of the interest is centered. It would naturally be expected that the majority of these cars to make their first public bow would be products of New England factories. Such is not the case, however, for of the five entirely new makes or models, three come from the middle west. The two remaining are bona fide New England cars—one being made in Boston, and the other in its immediate vicinity. It may at first seem strange that these three manufacturers should come so far east to make the first exhibition of their products and neglect entirely the New York and Chicago shows, which were held so much nearer home, but when it is remembered that these preceded the Boston show by several weeks, it will be seen that makers who were unable to finish their products in time for the earlier exhibitions are only too glad to avail themselves of the opportunities of this—the last of the big winter shows.

The cynics who are wont to exclaim, "What's in a name!" will find their question forcibly answered in observing the amount of interest aroused by the first appearance of the Herreshoff. Here is a car which, because it bears the name of the famous ship, boat and engine builder, is attracting a great amount of attention before it has even been given a chance in public to prove the claims for superiority of workmanship and materials, made by its builders. In appearance, this car resembles many of the light five-passenger touring cars with the short front hood now found on the market, and has very much the same lines as the Chalmers-Detroit. The four cylinders of the motor are cast in pairs and have both the inlet and exhaust



WHITE STEAMER IS SHOWN IN ITS VARIED STYLES

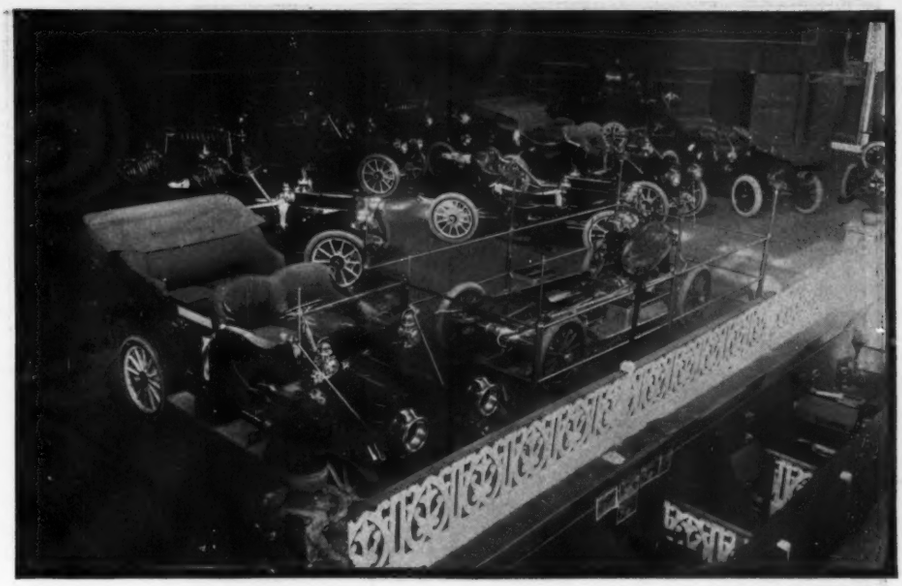
Shown at Boston

valves located on one side of the motor and operated by the single camshaft. The makers guarantee that its 3⅜-inch bore by 3¾-inch stroke enable the engine to deliver 24 horsepower to the rear wheels. The range of motor speed varies from 200 to 2,400 revolutions per minute, this being controlled by foot accelerator and set spark. The motor has three-point suspension, and has attached to it as an integral part, the gearbox, flywheel and clutch. This latter is of the multiple-disk type, having forty steel-to-steel plates. The transmission is of the three-speed progressive type, and the gears are cut from projectile steel. But one pedal is used on this car for throwing out the clutch and applying the foot brake. A slight pressure on this pedal throws out the clutch, allowing the car to run free, while an additional pressure will apply the brake to the drum on the rear wheels. The emergency brake, located in the usual place, is also applied at the brake drums of the driving wheels.

Employs Shaft Drive

A steel, tubular shaft is employed for transmitting the power to the rear axle—this, and the universal joints at either end, being enclosed in a torque tube. The rear axle is of the semi-floating type, and that in front is a drop-forged, one-piece, I-beam. The frame is of pressed channel steel containing three cross-members, and is offset over the rear axle. The springs are of the semi-elliptic type, both front and rear.

The double system of ignition is employed, using the Bosch high-tension magneto and four coils and battery. The spark plugs are set over the inlet valves. A gear-driven, pump-feed oiler supplies lubricant to all parts of the motor and transmission. The thermo-syphon system of water circulation is used, entirely eliminating the necessity of a pump for this purpose.



CADILLAC HAS PROMINENT PLACE IN THE BALCONY

The American Napier Co., which owns the rights to manufacture Napier cars in this country, has recently been reorganized with a working capital of $1,000,000. This company has taken over the old plant at Jamaica Plains and has rebuilt the former one-story main shop into a four-story building. The exhibit at the show consists of a four-cylinder, 40-horsepower touring car, the mechanical construction and features of which are different from any models heretofore brought out by the old concern. In addition to this model, the company manufactures a six-cylinder, 60-horsepower touring car and a four-cylinder, 20-horsepower runabout. These latter models are built along the same lines as the first, however, and a description of the one at the show will suffice to give the leading features of all three.

Napier Uses Twin Cylinders

The cylinders of the power plant are cast in pairs and have both inlet and exhaust valves located on the same side of the engine. The rotary pump and magneto are driven by a common shaft on the opposite side of the motor from the camshaft. The Bosch high-tension ignition system is used in connection with the magnetic self-starter of the same make. A new carbureter known as the Hoyt is used on all the American Napier cars. The representatives of the American Napier Co. at the show claim that this carbureter allows the four-cylinder motor to be throttled to 4 miles an hour on the high speed, and is, at all times, ready for instant acceleration.

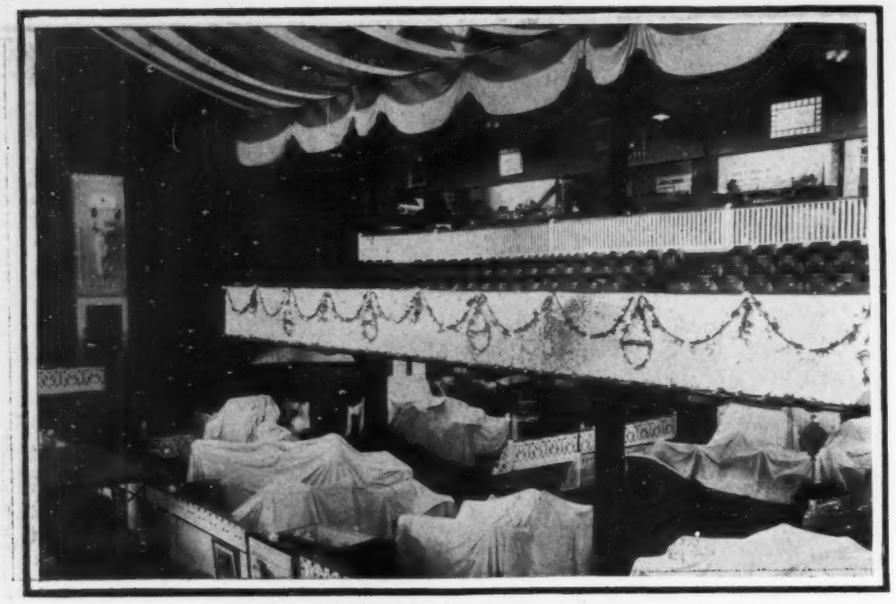
The cylinder dimensions are 4¾-inch bore by 5-inch stroke. The clutch is of the metal-to-metal, cone type, running in an oil bath, and then allowing the load to be picked up gradually when the power is applied to the rear wheels. The transmission is located under the forward seat, and is of the three-speed selective type. From here, the power is transmitted to the rear wheels by means of the shaft and floating axle system. The torsional stresses are cared for through the shaft tube and a special design of yoke, made fast to the frame, thus removing all unnecessary stresses from the universal joints.

The 60, 40 and 20-horsepower cars have wheelbases of 126, 120 and 100 inches, respectively, and all employ semi-elliptic springs with the exception of the six-cylinder model, which uses the platform type for the rear. Sufficient lubrication is obtained in the two larger cars by the gear-driven pump feed and in the small car by the splash system. The foot and emergency brakes are both applied to the drums on the rear wheels.

Commodious Welsh Car

A special model of car which attracts considerable attention is the English country car made by the Welch Motor Car Co. In this car the entire body is enclosed, the general contour reminding one of an old English stage coach of by-gone days. The interior is divided into two compartments.

EXHIBITS OF STEARNS, THOMAS AND RAMBLER



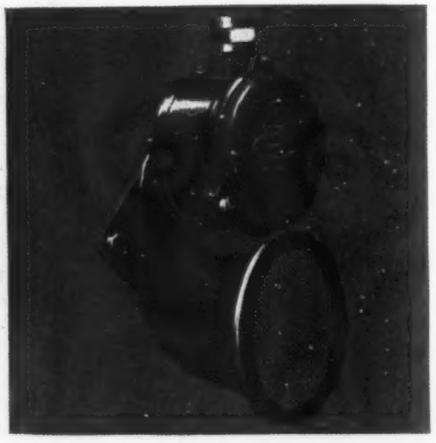
CARS PUT TO SLEEP FOR THE NIGHT

The forward one contains the driver's seat and is entered by a separate door located on the left side of the car. Back of the driver's compartment is the living room, large enough to seat six or eight people comfortably. The interior is handsomely upholstered and large, plate-glass windows on all sides admit a sufficient amount of light to make touring pleasant in all kinds of weather. The back of the rear seat is hinged at its upper edge, and this, when turned up and supported at the corners by stout straps fastened in the ceiling, forms a full-sized upper berth. The seat below is then made into a lower berth. When it is remembered that these berths are full size and run across the chassis—or at right angles to the wheelbase—some idea of the width of this car can be obtained. Numerous small closets and cupboards afford wardrobe space and make receptacles for all traveling necessities. Three trunks may be carried on this car—two on the roof and one on the baggage carrier located in the usual place at the rear. The body of this car is built on the stock chassis of the six-cylinder, 75-horsepower model, the same type of tires, transmission and control being employed as in the high-powered touring cars.

New Velie Car Shown

The Velie 30, represented in New England by the Kilbourne-Corlew Motor Co., is a car which has come all the way from Moline, Ill. But one type of chassis is made by this company, although the purchaser may take his choice of any one of five styles of body. The wheelbase is 110 inches and the clearance 10½. The four cylinders of the motor are cast in pairs and, together, develop 30 horsepower. The crankshaft has three large bearings and is drop forged from carbon steel. The double system of ignition is used, employing a magneto and storage battery, and two sets of spark plugs.

The most radical departure from the line of generally accepted motor car construction is found in the exhibit of the Compressed Air Power Co., of Boston, which manufactures a power plant for cars which consists, briefly, of a two-cylinder gasoline motor, a two-cylinder air compressor and a compressed air engine. In other words, it may be said that, while

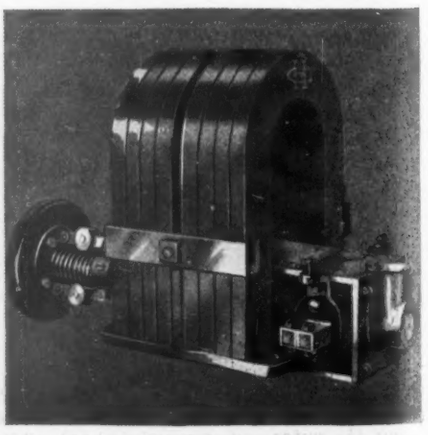


HOLTZER-CABOT HORN

the power is derived from a gasoline engine, compressed air is used for the transmission. The gasoline engine and air compressor may be considered as one unit, the connecting rods of all four cylinders operating on a common crankshaft. The motor and compressor cylinders are placed under a front hood in a horizontal position—each cylinder being at an angle of 90 degrees from the one on either side of it. As one faces the car, the forward and rear cylinders constitute the double-opposed, four-cycle, water-cooled motor—and the cylinders at right angles to these are the air compressors. All the four cylinders are placed in the same horizontal plane, and the whole plant is rendered easily accessible. The compressor cylinders are ribbed to afford ample cooling surface for the heated air. A heavy pipe conducts the compressed air to an engine located under the floor boards of the front seat in the place usually occupied by the transmission. This motor—or transmission—is practically a steam engine operated by compressed air, the gear reduction being virtually obtained by the elasticity, or compressibility of the air. In other words, when an extra load is applied to the rear wheels, such as in hill-climbing, the air engine will necessarily operate at a slower rate of speed. Inasmuch as the gasoline engine is delivering the same amount of power, however, the decrease in speed of the air engine will cause the pressure of the air at which it operates to increase—thus giving a greater amount of power for the reduced speed at which the engine is forced to run. This corresponds to shifting to a lower gear in the ordinary car. Another advantage claimed for this car is that, owing to the fact that the flywheel operates in a horizontal plane, a gyroscopic effect is produced which goes a long way toward maintaining equilibrium and stability while rounding corners.

New Panther Car

One of the lightest cars on exhibition is that recently produced by the Panther Car Co., Inc., of Boston. This weighs but 300 pounds and has almost the appearance of a toy car, but its 7-horsepower single-cylinder four-cycle motor, located under the front hood, is capable of driving it along at a pace not always equaled by the much larger cars. There is no transmission, the drive being direct to the differential located on the rear axle in the usual place. The motor is of the high-speed type, and, it is claimed, will drive the car up a 15 per cent grade at the rate of 20 miles per hour. A small multiple-disk clutch is located near the flywheel and, save for this, there is no interruption of the drive from motor to rear axle. A simple bevel gear and pinion transmit the power from the shaft to the rear axle and wheels.



HOLTZER-CABOT MAGNETO

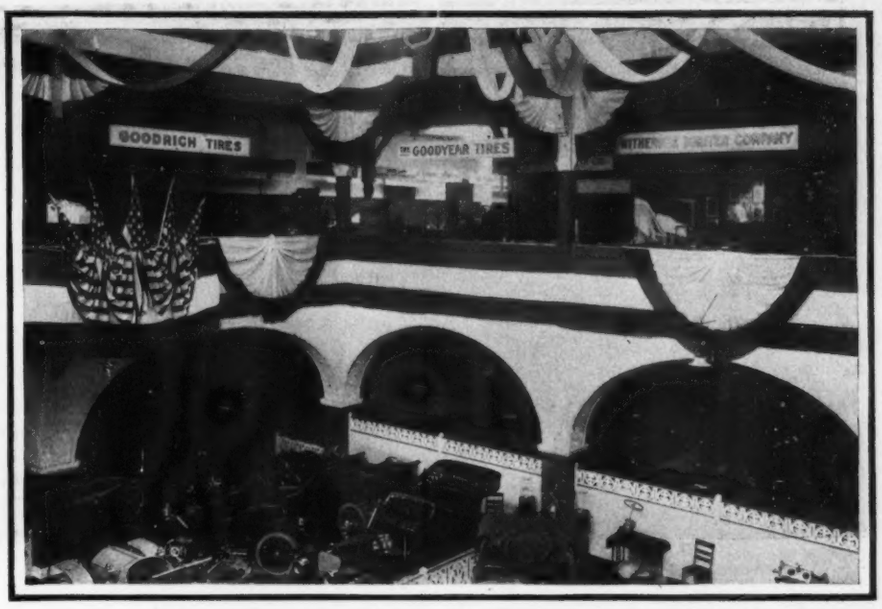
The Accessories

The Boston show, as a rule, brings out many ingenious accessories which are made in the New England states, and which have been exhibited at none of the other big shows of this country. This year proves to be no exception to the rule, and among the exhibits of the nearly 300 accessory dealers, are found many new contrivances and improvements for lessening the work of the motorist and increasing the efficiency of his car. Not all of these new accessories have been made in Boston or vicinity, as several of the western manufacturers have placed their product on the market so recently as to have been unable to exhibit at the previous shows.

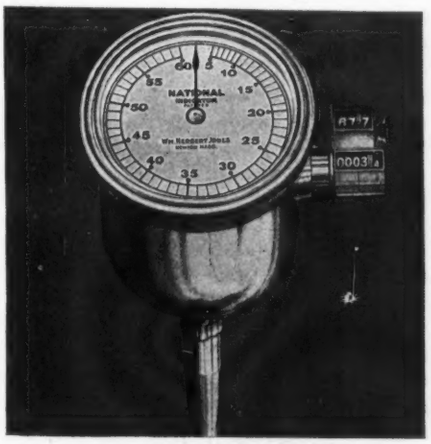
Tire exhibits are as plentiful as at any of the preceding shows, practically every dealer in this line of rubber goods in the country being represented. The exhibits include both the solid and pneumatic in all manner and variety of tread and in all kinds of canvas and rubber fabric. The Sterling Blue tubes, as the name implies, are colored a distinctive blue shade, which makes them easily discernible from tires of other makes. These are made from ordinary pure Para rubber and, before completion, are covered with a solution of rubber and ground mica. The purpose of this treatment is to increase the heat-resisting qualities of the tube and render unlikely blowouts from overspeeding the car. This same company also manufactures a leather non-skid shoe which employs a different kind of stud from that used in most shoes of this kind. Each stud is in the shape of a bright, round-head rivet with a steel washer. The head of this rivet is made of soft steel, while the washer is of a much harder quality. As the soft head is gradually worn away, an outer ring of hard steel with a soft core is formed which will last indefinitely. These tires, as well as a line of solid rubber tires, are made by the Rutherford Rubber Co., of Rutherford, N. J.

Kemizite for Tires

A new chemical preparation known as Kemizite is being demonstrated to show the qualities it possesses for preventing and healing punctures in inner tubes of tires. This is in the form of a creamy liquid which is pumped into the air valve of the tire when the latter is being inflated. The peculiar property of this substance is that it remains in solution only when subjected to an air pressure considerable above that of the atmosphere, and will immediately solidify as soon as this pressure is reduced below a certain amount. This creamy coating, which is formed on the inside of the tube, stands ready to be forced out by the air pressure as soon as a puncture is made in the tire. But no sooner does this meet the reduced pressure than it solidifies in the form of a plug, the outer end of which is hard, while the base, or end inside the tire, remains plastic. It is claimed that this substance will increase the life of a tire, as well as heal punctures, from the fact that the smooth coating inside the tube reduces the air friction, and consequent formation of heat, to a minimum. This preparation is manufactured by the Auto Tire Security Co.



ONE CORNER OF THE BALCONY, LOOKING UP FROM MAIN FLOOR

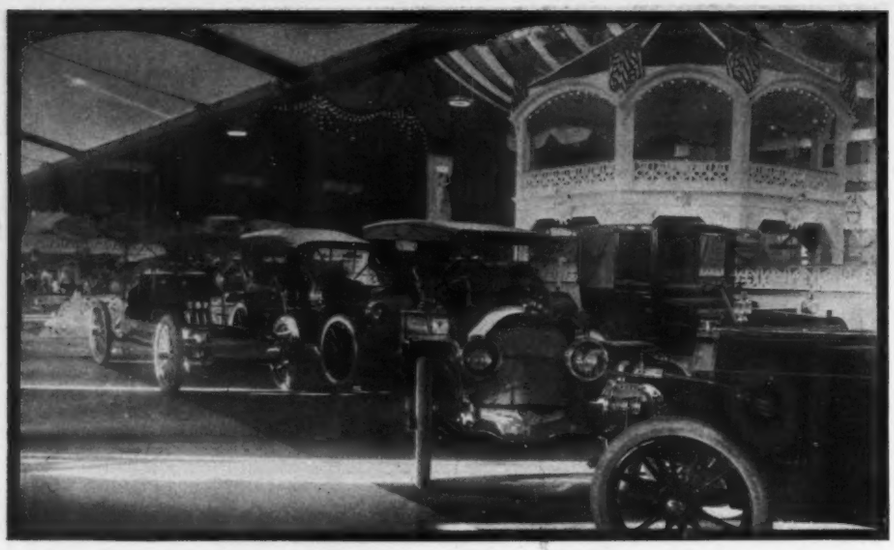


NATIONAL SPEEDOMETER

There seems to be no end to the number of ignition specialties that are placed on the market. These include batteries—both dry and storage—magnetos, spark plugs, timers, coils and everything which has to do with making a spark in the engine cylinder. One of the newest storage batteries on the market is the Harvard, made by the American Storage Battery Co., of Cambridge, Mass. The exhibit at the Boston show includes batteries for ignition purposes, and also for lighting and power service. All, however, are built on the same principle. It is claimed that these batteries are about 30 per cent lighter for a given power than any others, and that their length of life has been greatly increased by the use of a special plate. The plates are composed of what is known as a modified gelatine which, while remaining comparatively hard when exposed to the air, becomes porous and absorbent when placed in the acid and serves the same purpose as increasing the size of the plate. The batteries are rendered dry on the exterior—no matter how much shaking and jarring may take place—by a special form of stopper. This is a chemical rubber cone, which is placed in the cylinder-like vent and acts in somewhat the same manner as would a piston. If a jar disturbs the acid so that it slops, the cone is forced up, closing the vent. The rubber, however, naturally takes such a position that the vent is left open, and resumes this position as soon as the pressure of the acid on it is relieved. The cells are sealed after the plates are in place by pouring melted rubber over the top. This serves to make practically one piece of the case and top by vulcanizing the one to the other. Consequently, the vents, which are automatically closed, are the only apertures through which the gases or acids can escape.

A new liquid battery for ignition purposes is exhibited by the Burn-Boston Battery and Mfg. Co., of Boston. The cells are waterproof, and the liquid in them

SEXTON SWIVEL SPOUT AND PLUG



AMERICAN LOCOMOTIVES ARE PROMINENTLY DISPLAYED

will neither freeze nor evaporate. When the batteries have become exhausted, they may be recharged by filling with fresh liquid. The carbon terminal screw of these batteries is supplied with a lock washer which does away with the necessity of using the pliers for making good connections. The zinc connection consists of a non-breakable stranded wire soldered to the zinc element and buried in the sealing compound. This wire is tinned so that it will always remain bright. This wire can be connected directly to the carbon thumb nut of the next battery and reduces the number of connections to be made in a set by practically half. One of these cells is supposed to replace each dry battery in a set.

The Holtzer-Cabot Electric Co., of Boston, exhibits several electrical devices. One of these is an electrical horn which, while operated on the vibrator and diaphragm principle by a set of batteries, gives forth almost the same sound as that produced by a reed horn. The sound is very loud, but not ear-piercing. The operating mechanism and horn are encased in hard rubber and rendered waterproof. These may be wound to work on pressure up to 123 volts for 5 hours without overheating, and sparking at the contact points has practically been eliminated. This is the instrument which has been adopted by the navy department for emergency signaling. This same company also manufactures a new form of magneto in both the direct and alternating current types. The field of the latter is composed of eight flat horseshoe magnets which are placed side by side and separated by only small air spaces. The same form of magneto is also used as a generator for operating electric lights. When intended for this purpose, it is mounted near the flywheel of the motor and operated by a friction wheel placed near its periphery. A centrifugal governor on the armature-shaft regulates the pressure of this wheel to the amount of current required. These small generators are capable of operating six lamps on the car.

Adjustable Spark Plug

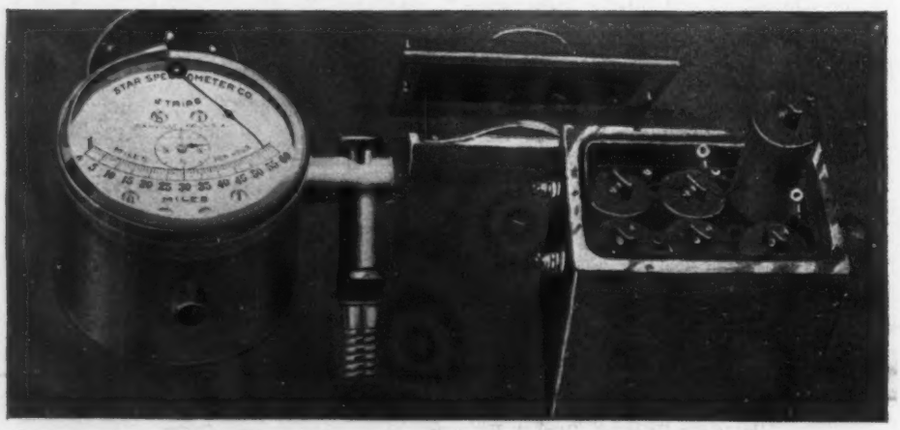
One of the novelties to be found among the accessory dealers is an adjustable and detachable spark plug. This is known as the Winestock detachable, and is made by the Winestock Mfg. Co., Perkinsville, Vt. This is of the multiple spark type, the gap being adjustable by turning a screw. The plug proper does not contain the threaded nut which is screwed into the opening in the cylinder head, but instead this nut is made separate and is left in the cylinder head when the plug is removed. A taper fit between plug and nut prevents leakage and the two are clamped together by means of the slot into which two horizontal handles fit when the plug is given a half turn. All parts are of brass, thus eliminating the possibility of adhesion due to rust.

A complete line of electrical instruments and indicators is exhibited by the Hoyt Electrical Instrument Works, of Penacook, N. H. One of the most attractive of these is a set in which a voltmeter and ammeter are mounted side by side on the same base. The ammeter reads from one to three in tenths, while the scale of the voltmeter extends to ten. The binding posts for each instrument are located on the nickeled base. All of these instruments are of the movable winding type and the whole mechanism is in plain view below the dial through the glass covering. The same company also manufactures the Triune voltammeter which in reality contains three instruments in one. The one indicator reads on the scale in volts, amperes one to three, or amperes one to thirty—depending upon which of the three binding posts on the outside of the case the proper terminal is connected to. This instrument also is of the revolving winding type.

Among a variety of shock-absorbers on exhibition, two or three will be found which are entirely new. One of these, the Monarch, is handled by Charles W. Kidder, of Stoughton, Mass., and is different in several essentials from any heretofore seen. In this design, the absorber proper is fastened to the frame of the car above the center of the spring, and connected to this latter by means of a connecting rod. The part fastened to the frame consists of a hollow plunger located in a horizontal cylinder and actuated by a heavy coil spring. This spring forces the plunger against the crank to which the connecting rod is fastened, and the friction thus caused has a tendency to prevent the crank from turning. The inside end of the crank near its pivot, is shaped like a cam in such a manner that the spring is allowed its greatest extension when the springs of the car are normally loaded. As soon as the car spring is flattened or curved, however, the crank is turned in one direction or the other and its cam-shaped end moves the plunger and compresses the spring with a ratio increasing with the arc of the circle through which the crank end swings. This serves to give the added resistance necessary to properly absorb the shock.

Hydraulic Shock-Absorber

A hydraulic shock-absorber which depends on the principle that it takes time to force a volume of liquid through a small opening—the time required varying with the size of the hole—is known as the Boston, and is manufactured by the Knapp-Greenwood Co. at Farmington, Me.



STAR SPEEDOMETER AND HERMETIC BATTERY CASE

This consists of a hollow cylinder filled with a non-chill oil which will not stiffen or harden in the cold. A piston, in which are located six check valves, operates in this cylinder. A by-pass controlled by a valve allows the oil to pass by the piston from one end of the cylinder to the other. When a sudden jolt tends to flatten the spring to which the absorber is attached, the check valves open and the piston moves freely to the further end of the cylinder. On the recoil, however, the oil must pass through the by-pass, but as this requires a greater amount of time, the piston resumes its normal position much more slowly. An indicator, placed on the outer surface of the cylinder, controls the valve in the by-pass, and in this manner the stiffness of the absorber may be regulated.

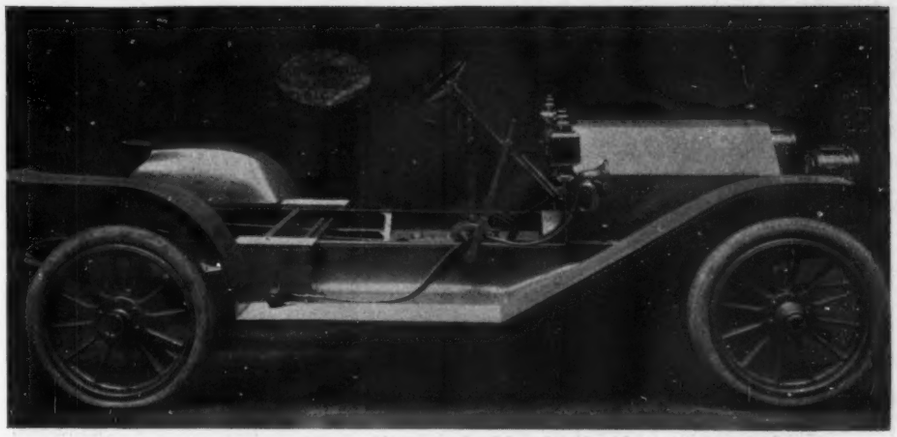
Buffing, grinding and polishing outfits of all kinds are demonstrated at the space of the Coates Clipper Mfg. Co., of Worcester, Mass. The most unique of these is a friction-driven buffing apparatus for polishing all metal parts of the motor. The power is obtained from the right-hand rear wheel of the car is transmitted to the buffer by means of the Coates flexible shaft. This shafting is of peculiar construction and consists of cone-shaped steel units, the small end terminating in a small ring, while the other extremity is formed in the shape of a socket. The shafting is made up of any number of these units, the small end of one being riveted into the socket end of the one next it—and vice versa. This forms a shaft capable of transmitting higher power than ordinary, and one which may be bent into any angle or into almost any shape. In case of a break in the shaft, a new unit may be supplied in a few minutes. This shafting is also made in light sizes for operating speedometers.

Tanks for Storing Gasoline

A large exhibit of tanks for the underground storage of gasoline and other inflammable liquids is made by the Gilbert & Barker Mfg. Co., of Springfield, Mass. These tanks are made of heavy galvanized steel and have all castings and joints located on top above the liquid. They are coated on the outside with coal tar.

Toolmakers are beginning to play an important part in every show. One of these, the William J. Smith Co., of New Haven, Conn., exhibits a number of adjustable reamers. By a one-lock cam bolt system employed on this reamer it can be adjusted to any size within its range in 1 minute. The blades may be removed for grinding when necessary. The adjustment of the blades is effected by a rotary movement of the cam bolt. The blades do not move longitudinally, and in consequence the front of the reamer is left free from obstructions for reaming to the bottom of the hole.

A complete line of iron and steel I-beams, channels, angle irons, bars, sheet iron and steel, and, in fact, everything required for the construction of the frame of a motor car, is exhibited by Arthur C. Harvey & Co., of Boston.

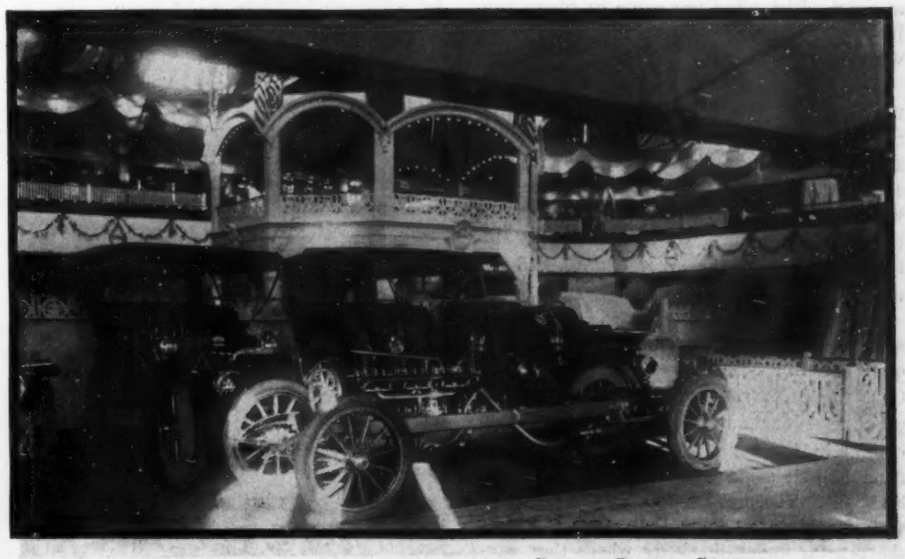


AMERICAN NAPIER SHOWN WITHOUT BODY

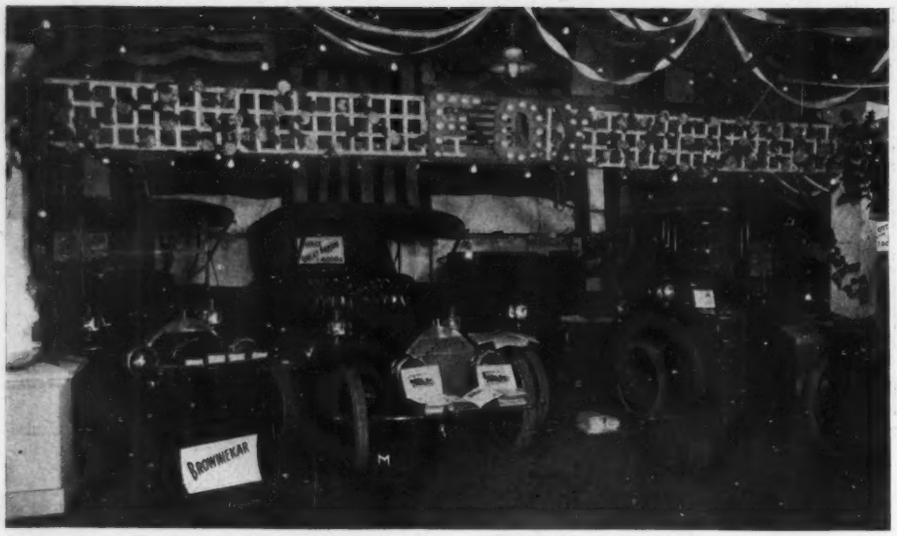
Sexton's swivel spout, manufactured by the Sexton Can Co., of Boston, is intended for use on any size of can. This enables the lubricating oil to be carried in the car without danger of leakage and allows the oil to be poured in the smallest opening without spilling. When not in use the spout may be turned in so as to occupy less pace and the plug may be screwed in place with a wrench with no fear of damage to the cap.

Hoyt Carbureter Shown

The carbureter which is used exclusively on the American Napier cars is made by F. C. Hoyt, of Boston. This contains several novel features, not the least important of which are the two needle valves and twin float valves. One needle valve is used for low speeds of the motor and delivers the gasoline in a fine spray into the primary air passage. When the speed of the motor is increased beyond a certain amount, the high-speed needle valve comes into play and delivers its fuel in three fine sprays in lieu of one thick stream. This separation of the incoming stream into three sprays is obtained by flattening the side of the needle valve so that a triangular pyramid is formed. This second needle is attached to the auxiliary air valve and is raised or lowered by it in accordance with the speed of the engine. In other words, when the speed of the engine increases to such an extent that its demand for air cannot be supplied by the primary passage, the secondary valve will be lifted by the excess pressure until a sufficient area will be obtained to admit the proper amount of air. This movement also raises the secondary needle valve, and as its taper is proportioned to the air passage, the incoming air is supplied with the proper amount of gasoline. Independent adjustments can be made for both the low-speed and high-speed needle valves. In order to obviate the difficulty often caused by the variation of the float due to the jarring of the car, the Hoyt carbureter is equipped with a special float. This is large and is composed of two separate cork floats supported on a vertical stem, the lower one being submerged about 1 inch in the gasoline of the chamber. This construction prevents the above-mentioned jumping action of the float and aids greatly in maintaining the fuel at a constant level in the carbureter.



POLISHED CHASSIS, ONE OF FEATURES AT STEVENS-DURYEA STAND



AT THE TERRE HAUTE SHOW—UNDER THE BALCONY

Two forms of small garages are erected in the basement of the exhibition buildings. One of these, constructed by the New England Cement Stone Co., of Norwood, Mass., is composed of hollow concrete blocks laid in the same manner as are building stones. These blocks are of uniform size and can be shipped from the factory to any part of the country—since they are much lighter than brick or stone. The peaked roof is also constructed of blocks, these, however, being of a different shape than those constituting the walls. The building is fireproof and can be erected at the cost of a wooden structure.

The Springfield Portable House Co., of Springfield, Mass., exhibits a neat-appearing portable garage which is shipped in sections and which can be assembled in a comparatively short time. This has long been a familiar exhibit at the various shows.

A complete line of pneumatic tires and accessories is shown by the Shawmut Tire Co. of Boston. By a special process, part of which is to vulcanize at low temperatures, the burning or weakening of the fabric is avoided. The tubes are made of tough rubber, and no flap is found necessary—whether lugs are used or not.

A new type of spare wheel recently placed upon the market is made by the United States Spare Wheel Co. of Detroit. These are spare rims containing an extra tire and are made in sizes to fit any motor car wheel. The rim is quickly attached without the use of a wrench by means of two stationary and two locking clamps, all of which are made of manganese bronze.

Several new designs of funnels, oil cans, and the like will be found at the exhibit of the Dover Stamping and Mfg. Co., of Cambridge, Mass. One of these is an offset gasoline funnel, which, by means of two elbows in the pipe, allows the top of the funnel to sit some 5 or 6 inches away from its spout. These are especially designed for such machines as have their fuel tanks at the rear or under the body where they cannot be reached by an ordinary funnel. The same concern also manufactures a combination measure and funnel. This can has a funnel-shaped spout by means of which the liquid may be poured into a small opening directly from the measure.

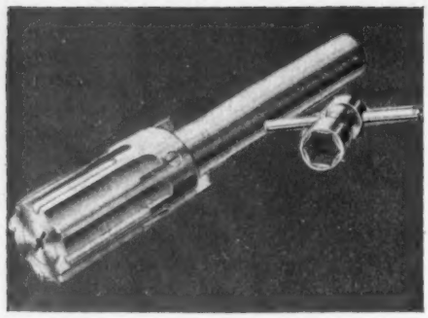
All kinds of sheet metal bodies, mud guards, tanks, dashes, and gear covers, as well as a complete line of copper intake manifolds are shown by E. B. Badger & Sons Co., of Boston.

The National speed indicator, made by William Herbert Jones of Newton, Mass., has a large dial which encircles the entire 360 degrees of the face of the instrument. The instrument operates on the centrifugal flyball governor principle, and the mechanism is arranged that the indicator may make more than an entire circuit of the dial without injury to any part. In other words, no stop is used and a 40-mile speedometer may indicate 60 or more miles by simply continuing on its second revolution of the scale. These instruments also contain a trip and total mile odometer.

Another new speedometer of attractive appearance is made by the Star Speedometer Co. of Danville, Pa., and exhibited by John D. Coward, of Boston. This is built on the principle of a centrifugal ball governor with a tapering opposing spring. Each wheel carrying the figures is locked to the one next succeeding and cannot be moved out of position until the car has traveled the corresponding distance. These are made with the total mileage and trip attachment.

Great Electrical Variety

A battery box which can be submerged for several hours in water with no attendant damage to its contents is made by the A. S. Morss Co., of Boston, and is known as the Hermetic battery case. This is made of oak or mahogany and is completely coated on the interior with a water-proof composition ½ inch thick. The cover is made water-tight by a rubber gasket set in a composition base, with a corresponding composition plate on the cover which presses against the rubber. The spaces between the cells are also filled with this composition.



SMITH ADJUSTABLE REAMER

A new coil, known as the J. & B., is exhibited by the Pettingell-Andrews Co., of Boston. The unique feature of this coil lies in its vibrator adjustment. The upper platinum point is mounted rigidly on a bridge member, one end of which is fastened and the other arranged to be raised or lowered by means of an adjusting nut. This bridge member is removed easily, and when this is done, both contact points are accessible for cleaning. Limit stops are provided on the nut so that the coil cannot be adjusted to consume more than ¾ ampere of current. It is claimed that a mileage of 1,500 can be obtained on a single set of dry cells when this coil is used.

No Wiring Used

A novel form of switch for ignition current is made by W. H. Leland & Co., of Worcester, Mass. This contains no wiring whatever, the terminals being embedded in the hard rubber base and extending out for about an eighth of an inch in the form of copper bars. In the coil which is designed for use with this switch, are spring contacts coming flush with the surface and corresponding in position and size to the terminals in the switch. When the switch is screwed in place on the coil, the connections are made positively and automatically without the use of wires of any kind. The switch is intended for use on double ignition systems and can be employed with magneto and batteries or two sets of batteries, as desired. When the lever is thrown, a small shaft is turned on which is placed three cams which make or break contact with the flat copper springs—as the case may be.

The Bi-Motor Equipment Co., of Boston, has produced a foot rest 6 inches wide by 30 inches long which can be made to lie flat in an instant when not in use. This is readily attached to any car and is designed to replace the stationary rods in use in many tonneaus.

LINCOLN SHOW SUCCESSFUL

Lincoln, Neb., March 6—The second annual Lincoln motor car show, which opened here in the Auditorium Wednesday morning, came to a close tonight, after a 4 days' very successful exhibit. In the number of exhibitors, factories represented, enthusiasm displayed and the amount of business done far eclipsed last year's show. There was a total of fifty cars shown, representing twenty-one dif-

ferent makes, and thirteen exhibitors. Of this number ten were car dealers and three handlers of accessories.

The Auditorium was handsomely decorated with wreaths of evergreen, strips of bunting and palms. An orchestra furnished music during the afternoon and evening, and a moving picture show was an additional form of amusement and entertainment during the evening. While the greater number of exhibitors were Lincoln men, several dealers from nearby points showed their cars. Among the latter were the Pioneer Implement Co. of Council Bluffs, with the Detroit electric; the William Steffens Co., of Beatrice, Neb., with the Thomas Flyer; the Powell Supply Co., of Omaha, accessories, and the Omaha School of Automobile Engineering. The largest individual exhibitor was the Sidles Automobile Co., which had six separate booths. A feature of the show was the large number of moderate priced cars, there being but two lines costing $3,000 or over.

For the first 2 days the attendance did not come up to expectations but as things became more settled, farmers from the surrounding country came in in large numbers. It was evident from the first, too, that these very country people were the real buyers, and apparently were more interested in the show than their city cousins.

Those who exhibited and the cars shown were:

Sidles Automobile Co.—Buick, Cadillac, Woods electric.
Lincoln Automobile Co.—E-M-F, Winton, Columbus electric.
E. E. Mockett Automobile Co.—Rambler, White steamer, Mitchell, Baker electric.
International Harvester Co.—Interdelivery and other trucks.
Pioneer Implement Co.—Detroit electric.
Powell Supply Co.—Accessories.
Nebraska Automobile and Storage Co.—Chalmers-Detroit.
Freeland Brothers & Ashley—Mason, Midland.
William Steffens—Thomas Flyer.
Wittman Co.—Ford, Waverly electric.
Maxwell Automobile Co.—Maxwell.
Standard Auto. Tire Co.—Accessories.

SHOW AT TERRE HAUTE

Terre Haute, Ind., March 6— Promoted by the Tribune, a 3-day show was held in this city on Tuesday, Wednesday and Thursday of this week which was a remarkable demonstration of the hold motoring has upon the Hoosiers. The affair was held in the armory, which was decorated in the national colors, the center of the room being canopied in streamers of red, white and blue, while a grill of vines interlaced with white, ran around the auditorium. Among the cars shown were the National, Overland, Stoddard-Dayton by John S. Cox; Buick by Marshall Williams; Pope-Hartford, Pierce-Arrow, Jackson and Rauch & Lang electric by Frank F. Fox; motor buggy by the International Harvester Co.; Cadillac and Columbus electric by the Wabash Auto Co.; the Reo by J. T. Cross; Thomas, E-M-F and Baker electric by the Terre Haute Auto Co.; Locomobile by the Locomobile company, and Mitchell by Orris B. Hinman. It is the intention to construct a larger building for the next show. At a meeting held last night steps were taken to form a motoring association, the direct result of the show enthusiasm.

TOLEDO'S DECORATIONS

Toledo, O., March 9—Toledo expects to furnish a sensation when it opens the doors of its third annual show Monday night, March 22, for 1 week. The show will be held in the Coliseum and the entire building will be encased in bunting. Every bit of the walls and ceiling will be hidden by this decorative matter and the floor will be covered with green grass cloth. At either end of the large building will be erected huge electric wheels. From the ceiling will be suspended about twelve immense hoops supporting yards upon yards of vari-colored ribbons that will be kept in motion by electric fans hidden behind the bunting on the side walls. Down the center of the building will be erected a triumphal arch adorned on top with a dozen massive flower pots containing imitation American Beauty rose plants with the roses in full bloom electrically lighted. These pots will be connected with gorgeous garlands of flowers which will also be strung around the building from the balcony railings. Stately imitation palms will be placed around the building in such fashion as to mark off the spaces and these will be decorated with miniature lights. At either end of the center of the building will be built up an enormous bank of flowers and palms that are living. Seasonable flowers in full bloom will be the principal factors of this real floral bank at either end. There are only seventeen spaces on the main floor and these have been given over to motor cars. But there are at least four or five applicants for car space who cannot be taken care of. Indications are that more than a hundred cars will be shown on the first floor and at least double that number could be secured were space to show them available. On the balcony the accessories and motor cycles will be shown. This show is to be held at the same time that the Retail Merchants' Board of the Chamber of Commerce is holding its spring style show, and spring opening is most auspicious, for the car dealers will benefit from the thousands of dollars being spent by the retail merchants in bringing thousands of people into Toledo from all over northwestern Ohio.

KEENE SHOW IN CITY HALL

Boston, Mass., March 8—Keene, N. H., one of the thriving little cities near the Vermont line, had a motor show last week which created much attention. It was the first one ever held there and it exceeded the expectations of the men interested in it. The show was held in the city hall, and this was decorated in black and white. Every space was filled by either motor cars or motor cycles. The Consolidated Motorists, under whose auspices the show was held, comprise about sixty enthusiasts from places in New Hampshire, Vermont and Massachusetts within a triangle formed by the corners of the three states. The organization has the following officers: Glenroy W. Scott, of Winchester, president; Fred Morse, of Keene, vice-president; C. C. Wilber, of Keene, secretary; Henry C. Lake, of Keene, treasurer. The committee in charge of the show consists of Harry C. Dean, C. C. Wilber, Fred Morse, J. Howell Jackson and Earl Carpenter, all of Keene.

BOSTON HYDRAULIC SHOCK ABSORBER

AT THE TERRE HAUTE SHOW—WHERE BAKERS WERE ESTABLISHED

KANSAS CITY MART FOR THE SOUTHWEST

KANSAS CITY, MO., March 9—Its first day opening with a rainstorm and closing with snow; the second day dark and cold and closed by a blizzard—so the third annual show of Kansas City put in the first third of its 6-day life. Weather better suited to drive visitors away could not have been selected. Demonstrating was uncomfortable and the trip to and from the hall in blinding gusts of snow was anything but pleasant. More tribute than ever, therefore, to a show, which, disregarding all these disadvantages, started with an attendance which will surpass anything ever seen here at a motor car show. In fact, the opening night proved uncomfortable for visitors. The crowd was too large. Tonight, with paper less thickly scattered, Convention hall, where the show is being held, was well filled.

As told by statistics, the show summarizes as follows: Total cars and chassis, 163—touring cars, 66; baby tonneaux, 15; runabouts or roadsters, 30; taxicabs, town cars and coupes, 5; limousines, 3; landaulets, 2; chassis, 18; buggy type, 10; electrics, pleasure types, 13; commercial cars, electric only shown, 1.

Show Not a Local One

The show is not for Kansas City. Except for two or three agencies which cater almost exclusively to the city trade, the territory about Kansas City supplies the buyers. Perhaps not more than 300 out of a total of 3,000 cars sold last year went to Kansas City users. But as a clearing house for the southwest Kansas City is to the fore. All this means business at the show. Most likely the local dealer does not benefit directly to any marked extent, unless he does a large wholesale business

The Gleason is one of the new cars shown. It is a conventional car except that it has 38-inch wheels and solid tires. Other features are the unit power plant consisting of a two-cylinder double opposed water-cooled motor lying in a transverse position at the forward end of the car, under the hood, a multiple-disk clutch, running in oil, and a selective sliding gear transmission, and shaft-drive. The engine is of the four-cycle type, with cylinders of the L type, cast separately and offset. Valves are on the top side of the motor and operated from a single camshaft contained within the crankcase. Thermo-syphon water circulation is the feature of the cooling system, and lubrication is by means of a sight feed pressure oiler with sight mounted on the dash, and gear-driven pump oiler in the crankcase. Ignition is jump spark, with plugs located in the valve chambers, where they are easily accessible. A Schebler carbureter furnishes the mixture. The motor, clutch and transmission which comprise the unit power plant are supported on a sub-frame, and suspended from the main-frame at two points in front and one in the rear. Transmission to the rear axle is through a shaft with two thoroughly encased universal joints, and bevel and spur gears. The rear axle is of the semi-floating type, equipped with roller bearings. Attention has been given the lubrication with means to prevent oil from leaking out on the brake-bands. A pressed steel frame is used, supported on semi-elliptic front and full-elliptic rear springs.

Another purely Kansas City product, but more or less known, is the Wonder, in which C. F. Ettwein made part of the southwest reliability tour last year. It also is of the buggy type, although pneumatics may be fitted.

Distinctly southwestern is the scheme of decoration, which is devised to make the great size of Convention hall seem smaller. Everywhere white and green bunting is employed. Over the arena it makes a ceiling. The same is true in the arcade and the balcony and wherever anything is exhibited. The entire arcade, as to side walls, is solidly covered with vertical stripes of this bunting. The effect of hiding the girders is pleasant.

Drawing conclusions on the basis of 2 days of performance, it is not too much to say that the Kansas City show looks like a fixture. There seems to be a growing tendency on the part of manufacturers to show here and, with the southwest absorbing motor cars at the rate of the past few years, the cultivation of this field will prove very profitable. While this section does not boast the highways of more favored communities, except in isolated spots, the legislatures of every state in Kansas City's trade territory are grinding away on good roads legislation.

List of Exhibitors

FOYER

C. L. Taylor Motor Car Co.—Marmon.
Bruening Automobile Co.—Apperson.
Wonder Motor Car Co.—Wonder.
Great Western Automobile Co.—Great Western.
Moon Car Co.—Moon.
Columbus Buggy Co.—Columbus electric and Columbus gasoline car.

ARCADE

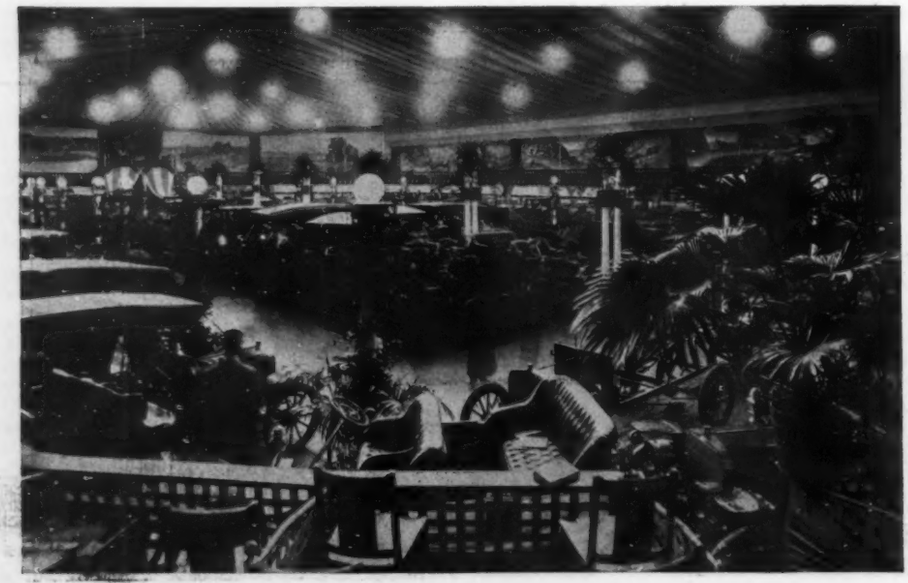
Jackson Motor Co.—Jackson.
Taylor Motor Co., Hutchinson, Kas.—Selden.
Hall Brothers—Dorris.
Missouri Valley Auto Co.—Reo, Premier and White.
Maxwell-Briscoe Automobile Co.—Detroit electric, Maxwell.
Studebaker Brothers Mfg. Co.—E-M-F and Studebaker.
Woodward Auto Co.—Knox .
Kansas City Chemical Co.—Soap.
Dey Motor Co.—Pierce-Arrow.
Midland Motor Car Co.—Oldsmobile, Peerless and Waverley.
Rambler Automobile Co.—Rambler.
Babcock Electric Co.—Babcock.
Auburn Motor Car Co.—Auburn.

MAIN FLOOR

John Deere Plow Co.—Velie.
Automobile Sales Co.—Pope-Hartford.
Tebeau Motor Car Co.—Stearns.
Demster Machinery Co.—Locomobile.
Fletcher Cowherd, Jr., Automobile Co.—Rauch & Lang electric, Corbin and Royal Tourist.
Ettwein Motor Car Co.—Mora, Stoddard-Dayton, Welch limousine and Fritchlle electric.
Western Motor Car Sales Co.—American Traveler, Overland and Brush.
W. H. McIntyre Co.—McIntyre.
Kay Valley Auto Co.—Mitchell.
Ford Motor Co.—Ford.
E. P. Moriarty & Co.—Packard, Stevens-Duryea, Chalmers-Detroit, Woods electric.
Central Auto and Livery Co.—Thomas and Cadillac.
Franklin Motor Car Co.—Franklin.
Buick Auto Co.—Buick.

BALCONY

Hollister Motor Car Co.—Great Smith.
Fidelity Oil Co.—Lubricating oils and greases.
Kansas City Auto Supply Co.—Accessories.
Pioneer Auto Top Co.—Tops and glass fronts.
Columbus Buggy Co.—Continental tires and removable rims.
Palace Auto Co.—Oakland.
Winton Motor Carriage Co.—Winton.
E. W. Clark—Bowser gasoline and oil tanks and appliances.
L. W. Scott—Stanley.
Van Guard Mfg. Co., Joliet, Ill.—Glass fronts and ignition apparatus.
Bradley-Alderson Co.—Fuller.
Holcker-Elberg Mfg. Co.—Tops and glass fronts.
Moriarty Auto Supply Co.—Accessories.
Schmelzer Arms Co.—Pierce motor cycle, Puritan gas tanks and accessories.
Keystone Oil Co.—Oils and greases.
Kansas City Vehicle Co.—Gleason.



AT KANSAS CITY—LOOKING SOUTH FROM THE BAND STAND

BADGERS ENTHUSIASTIC OVER THEIR SHOW

MILWAUKEE, WIS., March 11—That person who only a short time ago smiled when he heard that Milwaukee was planning a motor show, who shook his head and had cynicism written large on his features, is this morning the most enthusiastic of the hundreds who have come to view the really wonderful display of motor cars, motor cycles and accessories arranged in the big Hippodrome, on Wells street, between Sixth and Seventh streets, a stone's throw from motor row. The Milwaukee Automobile Club is a wonder, they all say today, in bringing a show of this magnitude complete before the public, alone and without the aid of professional promoters; along its own lines, and with only its membership backing it, has really accomplished wonders, and no mistake. The first motor show of Wisconsin opened at 8 o'clock last night, and at 11 o'clock the club officials estimated that no fewer than 4,000 persons had viewed the brilliant display of cars and accessories.

Big Attendance Expected

Judging from the first night's attendance the show should draw at least 17,000 to 20,000 people during the 3 days that remain. The doors will open each morning at 10 and close without intermission at 11 in the evening. The success of the show is already so apparent that the managers are seriously thinking of holding open on Sunday, because of the fear that not all visitors can be accommodated in the 4 days. Already the show has been extended 1 day from the original period determined at the outset.

President Clarke S. Drake, of the Milwaukee Automobile Club, general manager of the show, says that there are ninety-two cars on exhibition. The accessory exhibits number twenty-five and there are four motor cycles. Seventy-four cars are displayed on the main floor; eighteen on the balcony floor. The remainder of the gallery is taken up by the accessory and motor cycle exhibits. The ninety-two car exhibits include three commercial truck displays. Practically all of the agencies are exhibiting one complete car and one stripped chassis in each space. Fifteen agencies have two full spaces.

The Milwaukee Automobile Club's primary reason for holding this show is to give Milwaukee and Wisconsin what several other large cities and states offer to their people. The club members believed that the industry has grown enough in this state to warrant a show. There are about 7,000 privately-owned cars in Wisconsin, of which number at least 2,750 or 3,000 are owned in Milwaukee. The club, as the leading organization of the kind in Wisconsin, felt under obligations to the owners and prospective purchasers.

Another reason for holding the show was that the dealers of Milwaukee, nearly all of whom are state agents, demanded it. They looked with longing eyes to Chicago, which drew many people from their own territory; business which was their own and which they could have under like circumstances. Still another reason was that prospective purchasers implored Milwaukee agencies to conduct a show, so that they could have a comprehensive display to select from; view all the makes and then take the one that suited their fancy and idea.

Club Scores a Success

In satisfying all classes and fulfilling all desires, the club has been most successful. The tradesmen have shown the best of co-operation. They realize that as a strictly club affair the show is much more attractive than it would be as a commercial project.

The decorations embody the original ideas of the managers of the show, although much of the decoration used for the national show in Chicago is employed. Those who saw the Chicago show would hardly recognize the art pieces, statuary, paintings and columns as being from the Coliseum. The lighting arrangement is unique, and the brilliancy makes the Hippodrome as light as day at all times.

List of Exhibitors

Kopmeier Motor Car Co.—American; Detroit electric.
American Automobile Co.—Pierce-Arrow; Babcock electric; Apperson.
Johnson Service Co.—Johnson and Johnson trucks.
Jonas Automobile Co.—Peerless and Cadillac.
Welch Brothers Motor Car Co.—Packard Rauch & Lang electric.
W. L. Hibbard Motor Car Co.—Thomas Flyer and Chalmers-Detroit.
Emil Estberg—Pope-Hartford; Woods and Waverley electrics.
Curtis Automobile Co.—Reo.
Rambler Garage Co., of Milwaukee—Rambler.
Schreiber Motor Car Co.—Locomobile, Knox.
Stephenson Motor Car Co.—Speedwell, Welch and Overland.
McDuffee Automobile Co.—Stoddard-Dayton.
Akin Motor Car Co.—Stevens-Duryea, Columbus electric.
Kisselkar Co., of Milwaukee—Kisselkar.
Bates-Odenbrett Co.—Winton and Buick.
Sternberg Motor Truck Co.—Sternberg trucks.
Sanger Auto Co.—Franklin.
Excelsior Motor Car Co.—Cameron.
Gove Automobile Co.—Jackson, Regal.
Ogden - Farwell Garage — Studebaker, E-M-F, Studebaker electrics.
Edgar F. Sanger Co.—Maxwell.
Wisconsin Auto Exchange—Stearns, Midland.
Willard Campbell—Haynes.
Riverview Automobile Co.—Moon.
High Wheel Auto Co.—International.
Hickman-Lauson-Diener Co. — Cartercar, Ford.
White Auto Co.—White.
G. W. Browne Motor Co.—Mitchell, Marmon, Holsman motor buggy.
Olds Motor Works—Olds.
T. H. Kuenzli.—Motor cycles.
Theodore M. Glassner.—Motor cycles.
Harley-Davidson Co. — Harley-Davidson motor cycle.
Kopmeier Motor Car Co.—Indian motor cycle.
Accessories—Bland-Mueller Auto Co., General Accumulator Battery Co., Beaver Motor Co., Theodore Habhegger, Northwestern Storage Battery Co., Wold Brothers, Beckley-Ralston Co., Lembske-Briggs Coil Co., Cream City Trimming Co., George Wordingham, Milwaukee Auto Engine Co., Arthur Koenig Co., Wadhams Oil and Grease Co., Kamlee Trunk Co., Goodyear Rubber Co., Julius Andrae & Sons Co., King Leather Tire Co., Philip Gross Hardware Co., Pattison & Ellis, O'Neill Oil and Paint Co., Charles Abresch Co., A. J. Monday, Rubber Life Co.

AT KANSAS CITY—LOOKING NORTH ON ARENA FLOOR

MINNEAPOLIS READY

Minneapolis, Minn., March 9—After having dropped out of the show game for a year the Minneapolis Automobile Show Association will on Saturday, March 13, open what promises to be one of the largest and most successful of any of the shows held in cities outside of New York and Chicago. The mammoth Minnesota armory which has but recently been entirely completed and thrown open to the public for affairs of this kind, will be completely filled with exhibits, over 40,000 square feet of space having been sold by the association, and for the past 2 weeks tardy exhibitors have been writing for space. It is safe to say that had there been room 50 per cent more space could have been disposed of. All but a few of the local dealers are showing.

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Hostile Motoring Legislation Is Rampant

EXHIBIT A

"Be It Enacted by the people of the state of Illinois, represented in the General Assembly: That it shall be unlawful for any automobile, autocab, taxicab, or other horseless vehicle owned and used in this state for public or private use, to be geared with a higher speed or power that will propel such vehicle at a greater speed than 20 miles per hour. * * * Any person or persons who may operate any automobile, autocab, taxicab, or other horseless vehicle, on any public highway, or in any park, or upon any boulevard, or upon any street or alley, or any other public ground, that have been dedicated for public use, shall be deemed guilty of a misdemeanor, and on conviction of same shall be dealt with as the law for this state provides for the crime of misdemeanor."

EXHIBIT B

"No automobile or motor vehicle shall be set up, used, driven, or operated in or on any highway, townway, or public street, within any of the towns of Edon, Mount Desert, Freemont, and Southwest Harbor, on the island of Mount Desert, and the county of Hancock, state of Maine. * * * Whoever does so, shall on first conviction be punished by a fine of $20 and costs of prosecution, and on second and every subsequent conviction shall be punished by a fine of $50 and costs of prosecution, or by imprisonment for not exceeding 60 days, or by both fine and imprisonment."

EXHIBIT C

"The following fee shall be paid to the commissioner of motor vehicles, state of Maryland: Three dollars per annum for motor vehicles used only for transporting merchandise; $6 for motor vehicles with a rating of 10-horsepower or less; $12 for vehicles with a rating more than 10-horsepower and not exceeding 20; $18 for vehicles rated more than 20 and not more than 30; $24 for vehicles rated more than 30; $2 to operate a motor vehicle. These charges are for the entire 12 months of the year."

EXHIBIT D

"The following fee shall be paid to the secretary of state for registration of motor vehicles in the states of New York, Connecticut and New Jersey: Three dollars for vehicles less than 20-horsepower; $5 for vehicles of between 20 and 30-horsepower; $10 for vehicles more than 30-horsepower."

EXHIBIT E

"The commissioners of any county in Pennsylvania are empowered to adopt rules regulating and restricting the use of motor vehicles on its road, and to prescribe pecuniary penalties for the enforcement thereof. Any resident of a county, within which the violation of any rule so adopted shall occur, may institute and prosecute to judgment, and the amount involved for the recovery of any penalty, for the violation of any rule, the plaintiff shall be entitled to one-half, and the county the other half."

The five exhibits, published above, give a fair idea of what pro-motorists and motorists are trying to accomplish during the present sessions of the different state legislatures. So great is the interest in motor car legislation that in some states as high as ten bills have been introduced already, with more pending. In 60 per cent of the legislatures now in session, bills relative to the regulation of motor vehicles have been introduced, and motorists in such states are fighting these measures in the lobbies of the house as well as indirectly through the influence of motoring organizations on representatives and senators.

These five exhibits show the necessity for concerted action on the part of motorists, not only in any one state but in adjoining and adjacent states. An analysis of exhibit A, which is the full test of the bill, shows that the introducer makes it a misdemeanor for any motorist to drive a car of any nature that is geared to travel faster than 20 miles an hour, or has the power to go faster. In fact, the introducer goes further, making it a misdemeanor to drive a motor vehicle at all within the state. The absurdity of the two sections of this bill is too great to warrant even comment.

Exhibit B is indicative of the feelings of many citizens in the summer resort region of Maine, the intent of the bill making it a $50 fine, a 60-day imprisonment or both, to drive a motor vehicle in certain villages and towns of the state. In this state other bills have been introduced allowing motor vehicles to run in certain towns only 3 days a week; whereas, in other places the magnaminity of the introducer has gone so far as to permit motor vehicles to use the streets of certain towns on stipulated hours of each day.

In Exhibit C is demonstrated pecuniary instincts of Maryland legislators, and the horsepower taxation scale for motor vehicles reaching to $24 per annum for a vehicle rated at more than 30-horsepower. In addition, the person operating the vehicle must pay $2 for a license, giving him the privilege to operate such.

By way of contrast on licensing by horsepower is the rating given in exhibit D, which was drafted for the interstate legislation for New York, Connecticut and New Jersey. In these the horsepower rating is the same, but the figures $3, $4, $5 and $10 instead of $6, $12, $18 and $24. A license rating on this basis is at present being considered in half a dozen other states. If there is to be a license fee according to horsepower, then there should not be arbitrary divisions of vehicles, such as under 10-horsepower, from 10 to 20, from 20 to 30, and from 30 to 40, but the license should be so many cents per horsepower, that horsepower to be determined by formula. According to the Maryland scheme, a 10-horsepower car gets in for $6; whereas, one rated at 11-horsepower must pay $12, or just double the fee. This is unjust. A similar injustice is that a man with a car rated at 31-horsepower pays $24, and the man with one rated at 70-horsepower pays no more. The 70-horsepower car is a faster machine, and the possibilities of its destroying the roads are three times as great.

Exhibit E, from a Pennsylvania bill, indicates a most disastrous state of affairs should the bill become a law. It has two dangerous provisions: First, it gives the commissioners of any county power to set the legal pace for cars, and they can make it as low as desirable. Second, it provides for a fine or punishment, and gives the person who lodges the complaint against the motorists violating such speed ordinance one-half of this fine, the other half going to the state. With such a regulation Pennsylvania can have as many speed laws as it has counties, and in justice to the motorists traveling through the state would have to station a man on the roadside at the boundary line between counties to acquaint the motorists of the speed law in the county he is just entering. It is most dangerous to give the plaintiff one-half the fee, particularly as such would not infrequently be friendly with the county constable under whose jurisdiction the case would come.

All of these exhibits demonstrate the same facts, namely, that pro-motorists are at present busily engaged in hostile legislation. Every hostile bill introduced means the expenditure of cash raised directly by the motorists and motoring organizations to fight such legislation. So long as the power rests with the different states to make their legislation governing motor cars, just so long will there be an annual crop of such legislation, and so long will the motorists have to raise money to defeat such. This points to the ideal outcome, namely, federal legislation. One law for all the states and territories; one rate of licensing based pro rata on horsepower; one speed limit, not stipulated in miles per hour, but one that is reasonable and safe according to the environments; and one disposition of the fines, a part going to maintain the necessary machinery of justice in conjunction with the law, and the remainder to the maintenance and improvement of the roads.

FRENCH MAKERS' FIGHT AGAINST THE SALON

BRUSSELS, March 9—The reason a new organization has been started among French motor car manufacturers is directly due to the advisability of continuing the Paris show. The Chambre Syndicale des Constructeurs d'Automobile, or motor car manufacturers' board of trade, is different from the Chambre Syndicale de l'Automobile, which already exists for years, in that only car makers are admitted as members. In the now existing organization besides car builders all trades people connected with the industries allied to the car-making branch are admitted as members, and out of a total membership of 210 the car makers number only forty or forty-five. Thus they have not a majority in the organization. In the Chambre Syndicale de l'Automobile each trade is represented by a committee, and these committees examine the questions and projects presented by the members of the particular branch to which they belong. Thus, for instance, when the car manufacturers put up a project concerning the next salon the matter is taken under consideration, discussed by the committee of the car manufacturers and a report prepared containing the views of the committee. This report is then sent to the general committee of the whole association and at one of the general meetings the project, or rather the report, is read and then the whole of the chambre syndicale decides what to do. As the car makers control only forty or forty-five votes in an organization of 210 it easily can be seen that they sometimes do not win their point.

The future of the Paris show not only interests the manufacturers, but all who are connected with the various branches of the industry. It appears that a good number of manufacturers of parts and accessories are decidedly in favor of continuing the annual show. Among the car makers the majority is opposed to the show. Only the smaller concerns and a few of those who have always been successful in racing are siding the other way. In order to make it impossible to be defeated the car makers decide to organize among themselves and admit only as members manufacturers of motor cars. They think that in this way they will be able to dictate to the trade or industry in general, as they figure the allied trades solely rely upon them as they—the car makers—really make it possible for the others to exist.

As usual, the French motor car press does not say much one way or the other on such a vital question. If they speak against the salon they probably would lose the business of the makers who are for the salon, and if they side with the salon people they might lose the business from the other side. So it is up to the press of the other countries to bring out information and say what they think. That is being done in Belgium and Germany and also a bit in England. One Brussels journal in commenting upon the question says: "It is not so much a question of show or no show, races or no races, with our neighbors. It is a question of becoming every year more afraid of foreign competition and of finding means to restrict the other countries from increasing their steadily increasing importations of cars and parts to France. French makers would be almost unanimous in saying yes if a proposition was made them to hold a salon exclusively for French makers. They are afraid of the Belgians, of the Italians, of the Germans. And although the cars that are imported from those countries are not a very large number, their value is large and it shows that the high grade foreign car is much appreciated in France. Cheap cars do not attract the Frenchman when he is interested in foreign motor cars. Besides, the big money to the makers is in the high-priced cars."

French agents in the Belgian capital think that no salon will be held in Paris this year. Neither will many French concerns take a part in any of the foreign shows. If their cars are displayed it will be by the agents and without financial aid from the factory. "I believe a year of absolute quiet will do us good," remarked one of the local French car representatives to the Motor Age man. "The house may spend a little more in publicity and probably will effect some reduction in the selling price to the agents."

Max Richard, former president of the Chambre Syndicale de l'Automobile, commented upon the fact of the formation of the new association as an unnecessary undertaking, claiming the present body takes care of everything. Mr. Richard's remarks brought forth some sarcastic comment by the editor of Les Sports, a Paris daily. In his article the editor asks why it was that last December when the question of the future of the Paris show was brought up, that the chambre syndicale did not dare take action in an official manner. In other words, its members individually did the talking but the chambre as a body, as a national organization, did not say a word, just as if it was afraid to commit itself. Finally, when one of the members made a plea that the president of the chambre should make a statement he was told that the salon matter is to be avoided in an official way.

Leon Thery, of France, Dead

Cable advices received in Chicago on Tuesday stated that death has claimed Leon Thery, most famous of French road race drivers, who had to his credit two victories in the Gordon Bennett cup race—in 1904 and 1905—and who also distinguished himself by winning the French eliminating trials in each of those years. Thery drove his last race in the 1908 grand prix, for which he consented to come out of his retirement and again pilot a Brasier. As in the old days, he became the hope of France, for as the race developed the Frenchmen dropped one by one until only Thery had a chance to beat the Germans. At the start of the last lap he was in fourth place and running well and it seemed as if he had a chance. But it was not to be; that final circuit proved too much, and Thery failed to finish, the car winding up in a ditch by the roadside—a cylinder cracked and other things happening, Thery was forced to retire. Victories in the Gordon Bennett in 1904 and 1905 are said to have netted Thery a fortune that permitted him to retire and live comfortably. He started his career as a driver in 1898, but it was not until the following year that he won his spurs, getting second in the race around France. In 1900 Thery won the Bordeaux-Perrigegux road race and in 1901 he was sixth in the light vehicle class in the Paris-Bordeaux. The following year, 1902, saw him take sixth place in the Decauville in the Paris-Madrid race. The same year, he contested in the Paris-Vienna race as well as in the circuit des Ardennes. He was born April 16, 1879.

THE LATE LEON THERY

Places Penalties on Premier

Philadelphia, Pa., March 5.—The new contest committee of the Quaker City Motor Club has finally disposed of the Premier case, the aftermath of the New Year's endurance run to Wilkes-Barre and return, by declaring that McNamara incurred 270 points penalization for being ahead of time at controls. It is asserted that the observers' reports show the Premier was 7½ minutes ahead at Hazleton and 25½ minutes ahead at Hamburg, Reading, Pottstown, Norristown, and at the finish. This places the Premier thirteenth in the official list of finishers.

UNCLE SAM WINS CASE AGAINST IMPORTERS

WASHINGTON, D. C., March 6—The treasury department has been advised that the case of the Auto Import Co. vs. United States and Archer vs. United States, has been decided by the United States circuit court of appeals for the second circuit in favor of the government. The cases came before the court upon appeal from decisions of the circuit court reversing the board of general appraisers, which had affirmed the action of the collector in assessing duty on certain imported motor car tires.

The only question presented to the court was whether under the circumstances attending their importation certain rubber motor car tires should be considered as part of the motor car with which they came and assessed under the appropriate paragraph, "193. Manufactures wholly or in part of metal," or should be held to be separate articles of importation and assessed as manufactures of india rubber under paragraph 449.

The motor cars in question were imported in crates, each crate containing a complete machine, including four tires, which were not, and had not at any time been placed on the wheels. The theory upon which the importers contended that each of the cars and the tires which came with it should be considered as separate entities for duty purposes may be found in the following summary of the testimony:

Motor cars are sometimes imported with tires in place on the wheels; in very many cases they are imported without tires. In selling a machine it is the custom of the trade to give the purchaser an option as to what kind of tire shall go with it, so that as to any imported machine the importer cannot tell whether it will eventually be sold with the tires which the foreign maker sent with it or with some other kind of tire, domestic or imported. Tires are separate articles of commerce, and dealers in motor cars keep a large stock of them of various kinds. They come in standard sizes for the different sizes of wheels, and so far as the evidence shows, although the tires in these two instances had not been, in fact, placed on the wheels, they might be so affixed and the machines would then be complete and fit to run. The importer testified that he was not prepared to say that these tires were not ordered for the particular machines they came with.

It was brought out that an importer may import incomplete cars and tires separately, and if he does so they will pay duty as separate entities, even though it be his intention after he gets them here to assemble them and thus produce completed cars. But the majority of the court was of the opinion that under the decision in United States vs. Irwin, when the incomplete car and the four tires necessary to put it in running order are imported together, shipped by the same vessel for the same importer, and entered at the custom house at the same time, the parts are dutiable as a whole. As pointed out in that case, had the importer procured a policy of insurance against loss by fire or the perils of the sea, upon a "motor car on board the steamship," the policy would have covered the complete machine, although the chassis, the body and the tires were in separate cases and had never, before loss, been actually assembled.

The decision of the circuit court was therefore reversed. Judge Noyes filed a dissenting opinion, stating that he could not agree that rubber tires should be assessed as manufactures of metal merely because they were imported in a crate with a motor car upon the wheels of which they had never been, "and it is wholly problematical whether they ever will be, placed." In his opinion the Irwin case applies only where parts of articles are imported to be assembled upon arrival.

Some time ago Louis Sherry imported through the port of New York a motor car which he purchased in Paris. He claimed the car should come in free of duty under paragraph 504 of the present tariff act as a household effect in use not less than 1 year. In deciding the matter the board of general appraisers said that while the testimony left it doubtful as to whether or not the machine was in use the length of time claimed, it was unnecessary to determine this question in view of the decision of the circuit court of appeals in the Grace case, where it was held that a motor car could not be considered as a household effect within the meaning of said paragraph, inasmuch as it is not similar to books, libraries or the usual household and reasonable furniture, or either of them. While that ruling overruled many decisions of the board and of the circuit court extending through 10 years or more, and also was opposed to the practice of the treasury department, the board nevertheless considered it binding on it, and accordingly followed it in the present case.

BRISCOE DENIES A RUMOR

Tarrytown, N. Y., March 4—Benjamin Briscoe, president and general manager of the Maxwell-Briscoe Motor Co., today issued a statement, denying some of the rumors of mergers and consolidation which have been afloat and in which the Maxwell has been mentioned. Says President Briscoe: "We have been greatly annoyed recently at the publication of various rumors connecting the name of this company with mergers or proposed mergers of certain other motor car manufacturing companies. In some of these rumors it is intimated that the company has already joined with other well known companies; at other times it is intimated that our stockholders are connected with them in various capacities. We desire to state most emphatically that the Maxwell-Briscoe Motor Co. is not, neither are any of its stockholders or connections interested in any way in any consolidation scheme wheatever. This is not intended to be any reflection upon anybody's plan or plans, but simply aims to make our position clearly understood."

ROAD RACE FOR CALIFORNIA

Los Angeles, Cal., March 5.—Some time in July or August it is proposed by the Automobile Dealers' Association of Southern California to run a road race, and with this idea in mind Ralph Hamlin and Leon T. Shettler are investigating the country hereabouts in search of a suitable course. A triangular circuit 11 miles in length has been found near Toluca, the advantage of which is that the race can be watched for 5 miles from the grandstand and which could be put in perfect condition upon the expenditure of about $5,000. Another course offered is near the Soldiers' Home, leading through Santa Monica to the ocean, then following the Santa Monica bluffs to the Palisades to the road west of the Soldiers' Home property and back to the starting point. This circuit is shorter than the other, being but 8.2 miles.

ORMOND MEET CERTAIN

New York, March 8—The Ormond beach meet will be held the latter part of this month as scheduled, but for a time it looked as if the new rules of the American Automobile Association might result in the affair being called off. However, the Florida East Coast Automobile Association, after fully considering the matter, has decided it will stay in the national organization and run the meet. It is stated that $4,500 in cash prizes has been deposited in the Merchants' Bank at Daytona in accordance with the new rules, and that everything possible will be done to make the affair a big success. De Palma, Strang, Burman and other famous drivers have entered and in addition to the motor car events there will be a motor cycle marathon. Joe Folger will attack the mile bicycle record, using a motor car as a pacemaker.

KNOX WINS MATCH RACE

Buffalo, N. Y., March 9—Motor car circles in these parts were considerably stirred up yesterday by an event which involved the respective merits of a Packard and a Knox car and a private wager of $500 between two prominent men. Pliny McNaughton owns a Packard touring car. William Lutz places his faith in the Knox. They met at the Iroquois hotel a few days ago and got into a friendly argument over their cars. Before much time had passed each had staked the sum of $500 on his particular car in a match race between the two from

Buffalo to Erie, Pa., and return, the car to get back to the starting point first to recover for its owner the wager and its owner to desist in his future laudations of his car in the presence of the other party. It was more of an endurance match than a race. Lutz elected to drive his Knox himself. McNaughton engaged William Densmore. The start was at 9:25 o'clock yesterday morning from the Iroquois hotel. The roads were the worst in the history of the seasons. The mud was sticky and in some places splashy, and at times there was a sufficient covering of sharp ice to cut the tires into ribbons. It took Lutz 12 hours and 50 minutes to make the trip, which testifies to the terrible condition of the roads. Densmore reached Erie first, some 20 minutes in advance of Lutz. Densmore didn't loaf around Erie, but started right back for Buffalo. Lutz drove into Erie and then tacked after Densmore's tracks. At North East, Pa., he found Densmore stalled. Lutz reached Buffalo at 10:25 o'clock last night. Densmore did not report at the hotel until 10:30 o'clock this morning.

"I blew off three tires between Buffalo and Fredonia on the way out," said Lutz in his story. "The roads were horrible. I wouldn't go through another race like that for all the money in Buffalo. Coming back the feed pipe on our gasoline tank snapped off. All the gasoline leaked out before we knew it. I finally located a farmer about 3 miles off and he had a gasoline engine. He gave us a bucket of gasoline and on this we managed to get home."

GRAND PRIX CLAIMS SETTLED

Paris, Feb. 28—The Automobile Club of France has got out of its grand prix with a loss of $800 only. Natives whose land had been rented for grand stands, etc., protested at the abandonment of the race, and certain villages spoke of suing for damages. The matter was settled, however, by the payment of the sum of $800 to the organizing committee, to be distributed as an indemnity to those persons who had actually entered into an agreement to rent their land. Medals will be granted to all commissaires who acted at the last grand prix races, and this accomplished, the racing board has practically ceased business for 12 months.

LABOR ADMITS ITS DEFEAT

Detroit, Mich., March 8—The Detroit Federation of Labor at its last meeting listened to a pathetic but eloquent statement from the lips of John Hancock, delegate from the Horseshoers' Union, in which he made no secret of the fact that the Detroit trade has been all but wrecked by the advent of the motor car and motor truck. "Work is scarcer, horses are fewer, our trade's shot to pieces and more shops are being deserted every month. There will soon be nothing for us to do but to go to work in a motor car factory." Thus spoke Hancock to the assembled representatives of the trades.

CLAIM START OF TOUR

Detroit Motorists Take It For Granted They Will Get Glidden Plum — Entries Promised

Detroit, Mich., March 8.—That Detroit will be the scene of the start of the 1909 Glidden tour is considered locally as good as settled, the support of trade organizations as well as the fulfillment of the conditions laid down by Chairman Hower of the A. A. A. contest board being both assured. Formal announcement is not expected until about April 1, due to the fact that it has been proven necessary to make arrangements for the tour in advance of the announcement, to prevent the tourists from being victimized by unscrupulous hotels and others.

President Metzger and Advertising Manager Pelletier of the E-M-F, have taken the lead in Detroit's campaign for the start of the tour and returned to the city Saturday jubilant, following the resolution of endorsement passed by the N. A. A. M. and a conference with the chairman, which followed.

Detroit's original promise was fifteen cars in case the start of the Glidden was secured for this city. As seems probable now, this number is likely to be considerably exceeded and this by the entry of cars which have not heretofore figured as Glidden regulars and some of which have never before taken the run. According to present indications Detroit will enter three E-M-F's, three Chalmers-Detroits, three Oldsmobiles, three Reos, two Brush runabouts, one or two Oaklands, a Cadillac, an American Simplex, and a Gyroscope in the regular run with a possibility of two or three more. In addition, the E-M-F furnishes the pathfinder car which will start from Detroit about April 15, to lay out the exact route. Two E-M-F's will act as confetti cars for the tour and a Packard will be, in all probability, the chairman's car. In case matters progress along the lines at present laid out, the tour will leave Detroit July 5 or 6 taking in Chicago, Omaha, Denver and Kansas City—a distance of about 2,500 miles.

Endorsed by N. A. A. M.

New York, March 6—The monthly meeting of the National Association of Automobile Manufacturers adopted a resolution to the effect that it would be a proper and a fitting tribute to the enthusiasm displayed by the motorists of Detroit to start the 1909 American Automobile Association tour from that city, in view of the fact that Detroit has become the greatest motor car manufacturing center in the world, it being estimated that the value of the products of that city for the year 1909 will be $50,000,000. In addition to this action General Manager Miles reported that the Chicago show had been the most successful the association ever had held. Committees appointed by the N. A. A. M. were as follows:

Membership—S. T. Davis, Jr., Benjamin Briscoe, C. C. Hildebrand.
Legislative—W. R. Innis, R. D. Chapin, C. G. Stoddard.
Roads—R. D. Chapin, S. T. Davis, Jr., L. H. Kittridge.
Show—W. E. Metzger, A. L. Pope, Thomas Henderson.
Contest—H. O. Smith, W. T. White, W. E. Metzger.
Audit—Benjamin Briscoe, S. T. Davis, Jr., Charles Clifton.
Traffic—A. L. Pope, W. R. Innis, C. C. Hildebrand.

Glidden Scout in Blizzard

Chicago, March 10—George Smithson, driving the Studebaker scout car from Denver to Chicago for the Denver Motor Club, for the purpose of proving the feasibility of the Chicago-Denver route as part of the Glidden circuit, reached Boone, Ia., last night. He reported that he is battling with one of the fiercest blizzards and snow storms that ever struck Iowa, in comparison with which the New York-Paris storms were mere zephyrs. Still, he is making slow progress and expects to reach Chicago about Friday. Smithson left Denver a week ago yesterday. He is accompanied by H. B. Ewbank, Jr.

REBATE FROM GARDEN SHOW

New York, March 6—Over $40,000 will be rebated to the exhibitors of motor cars and members of the Motor and Accessory Manufacturers and Motor Cycle Manufacturers' Association in the recent Madison Square garden show. This report was made by Colonel George Pope at the Thursday meeting of the board of managers of the Association of Licensed Automobile Manufacturers. Even with this rebate the A. L. A. M. has left a large working capital for future shows. It is claimed this $40,000 rebate is the largest refund ever made in a national show and it is an increase of nearly 40 per cent over the seventh garden exhibition and nearly 100 per cent better than that of a year ago. The same committee, George Pope, Charles Clifton and E. P. Chalfant, with M. L. Downs for secretary, was appointed to conduct the tenth show next winter. The Hudson Motor Car Co., of Detroit, which is occupying the old Northern plant, has been admitted to membership in the Association of Licensed Automobile Manufacturers.

DEATH OF HENRY BAUSCH

Rochester, N. Y., March 6—Henry Bausch, a member of the Bausch & Lomb Optical Co., died at 3:40 o'clock Tuesday morning in Augusta, Ga., where he had been since the latter part of January for his health. He would have been 50 years old on March 14. Besides his wife, who was with him when he died, he leaves one daughter, Elsa. Mr. Bausch was the third son of J. J. Bausch, who, with Henry Lomb, organized the immense optical plant which bears their names. He was born in Rochester, was educated in the public schools and the old Free academy and Cornell university. Mr. Bausch had long complained of illness, but his condition did not reach a serious stage until about a year ago.

SNOWBALL LIMITED'S BATTLE WITH ELEMENTS

SYRACUSE, N. Y., March 5—A technical examination has been made of the 30-horsepower Regal in which George D. Wilcox of the Mora Sales Agency of Syracuse, William Smith and Richard Byrne drove from Detroit to this city, starting February 22 and finishing here last Monday. The examination failed to disclose any wear or tear despite the strenuous work to which the little car had been put in making this mid-winter journey through mud, snow and slush. The stunt was undertaken because during the Detroit show Wilcox, while discussing the merits of the various machines, remarked that he did not think there was a moderate-priced car on the market that was capable of making a first-class endurance run over roads that were considered impassable, adding that the car was yet to be found that could stand the test. The Regal representative immediately took Mr. Wilcox up on this remark, making the following proposition: Mr. Wilcox was given the privilege of taking any car in the course of construction that he might select from the Regal plant; the Regal company furnishing the driver and the trip taking place at once, thus doing away with any opportunity for giving the car a final test or any special attention. If the car went through without any trouble, Mr. Wilcox agreed to pay all expenses and cost of machine. On the other hand, if any trouble occurred en route, the Regal company was to pay all expenses and take the car back. Saturday morning Mr. Wilcox appeared at the Regal plant and selected a partly-painted car, leaving an order that it was to be ready for him at 11 a. m. on Monday. The car was ready at that time and at 1 o'clock the Snowball Limited left the Pontchartrain hotel.

Battle With Elements

Everything went well until the end of the brick pavement in Detroit, where the car fell off into a sea of bottomless mud, ice and snow. For 40 miles into Monroe, Mich., it was a case of battle against every possible difficulty on roads that are absolutely indescribable. The car reached Monroe at 6 o'clock. Pushing on, they reached Toledo at 9 o'clock. The entire distance of 26 miles from Monroe to Toledo was driven on the low speed without overheating. The Snowball Limited rolled into the garage of the Atwood Auto Co., and the following telegram was sent:

Toledo, O., Feb. 22.—Regal Motor Car Co., Detroit, Mich.: Wilcox reached Toledo 9 o'clock safely. Terrible trip. Roads soft. Car touched running board full length at times. Wore out four chains and one casing. Pulled farmer with load of hay out of mud hole. Car in perfect shape. Leave 8 o'clock in the morning for Cleveland. Expect to arrive tomorrow night. Howard L. Spohn, 10:10 p. m.

Encounter a Thaw

Amidst a drizzling rain which had softened the snow into a mass of slush, which made the running all the more difficult, the Snowball Limited started out once more Tuesday morning. Just out of Toledo, it ran into a lake of water a quarter of a mile long and so deep it poured over the floor boards of the car. Not to be outdone by wind or weather, the little car pulled through this and came out on the other shore. The rain continued and the roads, under the influence of the warm rain, began thawing so that by the time Fremont was reached, the traveling was almost equal to that of going over a soft plowed field in spring. After partaking of a little nourishment at Fremont, the crank was again turned and the Snowball Limited started eastward, striking a good stone road for about 20 miles into Monroeville. Telephone poles were prostrated across the road and the crew were obliged to do some careful driving to avoid the fallen trees and wires. This was nothing, however, in comparison to the troubles encountered after leaving Monroeville. Dropping from a stone road into a swamp the car sank up to the hubs, which compelled Smith to drive the next 15 miles into Norwalk on the low speed. The Snowball Limited pushed ahead until reaching a point 2 miles west of Florence, the travelers found a river minus a bridge, which had been swept away by the storms. As the car was not equipped with wings and hurdling was impossible, further progress in that direction was out of the question. However, the men of the Snowball Limited were made of the stuff of those who came over in the Mayflower, and being determined to push on at all hazards, switched the car onto the local trolley tracks and bumped over trestles and cross ties until they reached Florence, landing cold and exhausted in a farmer's barn at 2 o'clock in the morning.

A very pleasant night was spent among the pigs and chickens, dreaming of home and mother, until they were disturbed by a kiss from the farmer's tom cat, who had come out to investigate the strangers; and they awoke "in the cold gray dawn of the morning after" to find a howling gale and snow storm in full sway. With many regrets the motorists left their barnyard friends and 15 miles of heart-breaking work with shovels and spades through the half frozen ground brought them into Elyria at 11 a. m. At Elyria, they were met by an expedition from the Cleveland agency, headed by Sales Manager George W. Franklin from Detroit and a warm reception was given the car and its crew. From this point the following telegram was despatched:

Elyria, O., Feb. 24.—At Elyria, New Andrews hotel. Impossible, cannot reach Cleveland until afternoon. Car running fine but roads bottomless. George D. Wilcox.

Silver Lining in Cloud

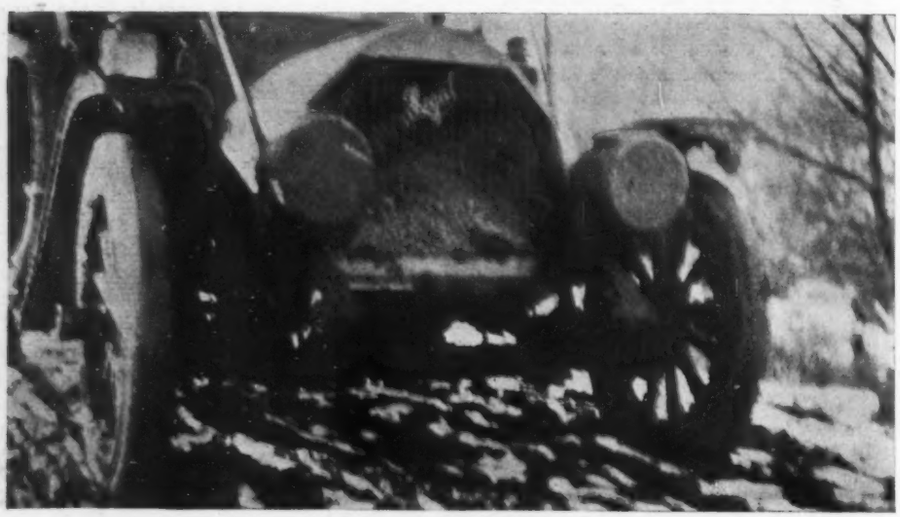
They say every cloud has a silver lining and the men of the Snowball Limited found theirs in the excellent road from Elyria to Cleveland. The following telegram was dispatched from this point:

Cleveland, O., Feb. 25.—Car arrived 1 o'clock in perfect condition. Delayed 36 hours west of Elyria on account of floods. Leaves immediately for the east. Films and story follow special delivery. George W. Franklin, 4 p. m.

The Snowball Limited arrived in Cleveland during the show, and after replenishing the supply of gasoline and oil the car was ready to continue to the end, as shown by the following telegram to Detroit:

Cleveland, O., Feb. 25.—The Snowball Limited left Cleveland for Syracuse at 3 o'clock. George W. Franklin.

Leaving Euclid avenue in Cleveland, the tourists dropped off again into bottomless mud, which was fast freezing into a compound that for resistance and stickiness beat any brand of glue yet devised. Night came on and the lamps were lighted; the mud chains being renewed at Willoughby, 18 miles out; at which point they were entertained and encouraged by a chorus of wise ones, who predicted direful results when they would reach "that patch of clay in Jones' holler," or the "darndest biggest hill in Ohio" just ahead. Regardless of sage advice, however, they plugged on, pulled through



MUD PICKED UP BY THE REGAL

"that patch of clay" and climbed that "darndest big hill in Ohio," thanks to their faithful motor. At last, Ashtabula was reached, as shown by the rather expressive telegram:

Ashtabula, O., Feb. 26.—We arrived here at 9 o'clock last night in fine shape. Roads rotten. William H. Smith.

A Gridiron of Torture

Seven o'clock found them on the road again, headed for Erie and bumping along over horrible streaks of disturbed soil, by courtesy called roads, but now frozen into a gridiron of torture for car and crew. The following telegram shows the condition of the crew at this time.

Ashtabula, O., Feb. 26.—Snowball Limited left Ashtabula at 7:30 for Erie, Pa. All the boys had bad colds. George W. Franklin.

The tires went one after the other for 8 mortal hours, until at 3 o'clock, 15 miles from Erie, the roads had finished the last of their six new shoes and the men were left "barefoot" by the road side. However, necessity being the mother of invention, they dragged their weary bodies out of the car and tied the mangled tires to the rims with clothes line, pushing on once more, determined to do or die. Twelve miles from Erie they heard the good news that a fresh supply of tires had arrived and was waiting for them at the trolley station, 2 miles distant. Driver Smith headed an expedition across the fields to secure the much needed tires and at 7 o'clock returned alone, the other members having collapsed from their hardships and being compelled to go to the city in search of a physician. The ride was a little more comfortable after the new tires had been put on, and leaving Erie on Saturday morning, they faced a howling snow storm on their way to Buffalo. The 6 o'clock whistles announced their arrival in Buffalo. Another telegram was sent to the factory from the crew at this point, as follows:

Buffalo, N. Y., Feb. 27.—Reached Buffalo at 6 o'clock. Going on to Batavia tonight in an attempt to reach Syracuse tomorrow. Roads somewhat better, but still very bad. Snowing. Car running fine. George D. Wilcox, 7:30 p. m.

This had been their longest day, the car having covered 100 miles in 12 hours. Feeling much encouraged, they pushed on through the blinding snow to Batavia.

Sunday morning had no church bells for the Snowball crew. The storm was still raging and the roads had become a trackless waste, marked only by fences. However, 10 o'clock found them at Rochester. After a hasty visit to the Regal agency, they were off again for Auburn, N. Y., via Canandaigua, reaching that city at 5 in the evening. The last 30 miles was over horrible roads.

Auburn, N. Y., Feb. 28.—Only 25 miles from Syracuse tonight. Roads terrible. Heavy snow. Hurrah for the Regal. Snowball running perfectly. Not an adjustment or repair to date. Finish Monday noon. George D. Wilcox.

This was the banner day of the Snowball Limited, having made good on a long perilous trip and only 26 miles from "home, sweet home" and Syracuse. The last lap into town was easily made on Monday morning.

TWENTY-NINE PRIZES IN WHITE CO.'S TROPHY CABINET

MOTORING TROPHIES WON BY THE WHITE ON PACIFIC COAST

Twenty-nine different trophies represent the prowess of the White steamer on the Pacific coast and as tabbed by C. A. Hawkins their history is as follows:

1—Buena Vista hill-climb, San Francisco, February, 1908, for touring cars, $2,500 and under.

2—Five-mile race, John D. Spreckels cup, Automobile Club of California meet, San Francisco, November 6, 7, 1903.

3—Five-mile open race for California-owned cars, A. C. of C. meet, San Francisco, November 6, 7, 1903, Pioneer cup.

4—Five-mile free-for-all, A. C. of C. meet, Del Monte, August 27, 1904, Hammersmith and Field trophy.

5—Ten-mile open race at Santa Rosa, July 4, 1907.

6—First prize 5-mile handicap, Los Angeles Cycle Board of Trade, May 10, 1903.

7—Olympic Club meet, Tanforan, September 20, 1908.

8—For fastest mile at Tanforan meet, December 6, 1908; time, :59.

9—Witter Springs hill-climb for touring cars, $3,500 and under, August, 1907.

10—Twenty-five-mile open race, Santa Rosa, July 4, 1907.

11—Five-mile steam event, Los Angeles Cycle Board of Trade, May 10, 1903.

12—Five-mile open race, Ingelside track, San Francisco, October 5, 1902.

13—First prize, 1-mile race for steam vehicles, Ingelside, October 5, 1902; time, 1:49.

14—Five-mile race, A. C. of C. meet, San Francisco, November 6-7, 1903.

15—Three-mile race for steamers, Los Angeles Cycle Board of Trade cup, May 9, 1903.

16—First prize, 5-mile race, Auto Club of Southern California cup, Los Angeles, November 20, 1903.

17—Free-for-all Buena Vista hill-climb, San Francisco, February, 1908.

18—Five-mile for cars, $3,500 and under, national circuit meet, Ascot park, Los Angeles, December 26, 1908.

19—Five-mile free-for-all handicap, national circuit meet, Ascot park, Los Angeles, December 27, 1908.

20—Ten-mile race, Santa Rosa, July 4, 1907.

21—Five-mile open race, San Jose, September 9, 1903.

22—Five-mile race for stock machines, $4,000 and under, Tanforan, December 6, 1908.

23—Five-mile free-for-all handicap, stock cars, Coronado, Cal., January 17, 1909.

24—Free-for-all hill-climbing contest, Witter Springs trophy, August 3, 1907.

25—Five-mile Del Monte cup, A. C. of C. meet, Del Monte, August 26, 1904.

26—For fastest mile on Del Monte track, August 10, 1903, C. W. Clark trophy; time, 1:19.

27—Thousand-dollar perpetual challenge trophy for record run from San Francisco to Los Angeles, at present held by 30-horsepower White steamer.

28—Touring car class, fall race meet, Automobile Club of Southern California, 1904.

29—First prize for large touring cars, Los Angeles, Coronado endurance run, January, 1906. Cup presented by John D. Spreckels.

REGAL AND ITS CREW AT ELYRIA, O., AFTER 48 HOURS IN MUD

Legal Lights and Side Lights

LATEST IN ILLINOIS

INTRODUCED into the Illinois legislature by Representative Robinson, read by title, ordered printed and to the speaker's table is the following remarkable bill which is designated "to regulate the gearing and speed of motor cars, motor cabs, taxicabs or other horseless vehicles":

Section 1—Be it enacted by the people of the state of Illinois represented in the general assembly: That it shall be unlawful for any motor car, motor cab, taxicab or other horseless vehicle owned and used in this state, for public or private use, to be geared with a higher speed or power than will propel such vehicle at a greater speed than 20 miles per hour.

Sec. 2—Any person or persons who may operate any motor car, motor cab, taxicab or other horseless vehicle on any public highway, or in any park, or upon any boulevard, or upon any street or alley, or any other public grounds that have been dedicated for public use, shall be deemed guilty of a misdemeanor, and on conviction of same shall be dealt with as the laws of this state provide for the crime of misdemeanor.

Interpreted by some, this is taken to mean that the use of motor cars upon public highways is to be forbidden by making it a misdemeanor to use these machines on the road. No doubt the author of it meant first to prevent speeding by making it impossible to drive a car over 20 miles an hour, but in seeking to bring this about he is thought to have become hopelessly entangled in the battle with legal phraseology.

CONNECTICUT DISCUSSION

That there is much opposition to the present Connecticut motor car law is evident, and that it is due mainly to the indiscretion of a thoughtless element who never heed the fellow who walks or drives along the public highway in rural sections is also a fact. Hearings were assigned last week for the discussion of the proposed bills submitted to the present legislature, some of which would put a decided restriction on motoring. Some of the bills introduced were worthy of note in that their enactment would tend to improve matters. The hearings were before the committee on roads, rivers and bridges in the hall of the house. Representative Eckhard, of Stamford, is the sponsor of one bill, and he himself is a motorist. His bill provides for the fitness of a person applying for a license which shall be determined by the secretary of state, and adopts substantially a part of the New Jersey law, which would eliminate the present reciprocity feature of the Nutmeg state law and compels every nonresident to register in this state, reducing the speed limit to 20 miles an hour outside the city limits and 12 miles within, and compels drivers to bring their cars to a stop when approching trolley cars not in motion. In defense of his measure, Representative Eckhard stated that it must be self-evident to all that the present law is not what it was expected to be 2 years ago. It was thought to be a model then, and some so regard it at the present time.

"In the hands of sensible people it was a good law, but we always have with us the road hog and the speed maniac, and it is against them that the public needs some sort of protection. The present law might be a good one, but there should be some safeguards thrown about it," said Representative Eckhard, who referred to fatalities occurring in Stamford and alluded to the fact that motorists from New York coming into Connecticut drive at a tremendous rate of speed.

Representative Clark, of Bridgeport, was of the opinion that there should be some discrimination made between the speed limit in cities and towns and sparsely settled communities. In order to go from one place to another he said that it would be necessary to drive at a rate of speed greater than provided for in the proposed amendments. He considered a speed of 25 miles an hour would not be unsafe or hazardous to the traveling public. Representative Dormitzer, of Woodbury, heartily endorsed the speaker's remarks in relation to the speed limit on country roads, and alluded to the New Jersey law as an undesirable feature. He said that the development of motor travel had brought motorists into Connecticut and they have left their money there. He was of the opinion that to compel visiting motorists to register would be a serious mistake. He stated that he would be very much opposed to such a proposition.

J. H. Hale, of Glastonbury, one of the largest peach growers in the United States, said his wife sometimes had to drive a horse after dark, and believed there should be some law that would compel motorists approaching a team to slow down. He said that the roads in the country were not built for motor cars, and are very narrow. He considered it unsafe for women to drive upon the highways, and they should be protected. Otherwise there should be two roads, one for motor cars and the other for horse travel.

Representative Quintard favored a strict examination of chauffeurs. He had noticed women driving cars and doubted if they could tell the difference between the steering gear and the tail light. He would be in favor of such a law as is in force in Massachusetts.

Sidney Downs, of Derby, urged the solution of the whole problem is in the establishment and enforcement of proper penalties. He would have a law that would take a man's car away from him for a period, depriving the driver of a license and the like. He did not believe an examination of chauffeurs would be possible, as any examination would necessarily have to be along the line of the individual's discretion and judgment. He believed that records would show fewer accidents in Connecticut during the past few years than in other states having a speed limit.

Ex-Representative Birdseye, a motorist, of Farmington, spoke in favor of the present law and referred to some resolutions adopted by the Farmington grange: To secure uniform legislation throughout New England; to provide an effective means for enforcing the law; to tax motorists according to horsepower; to have new markers each year; no colors to be duplicated within 4 years; to have all licenses expire December 31 of each year; speed limit to be placed at not over 25 miles an hour and 8 miles an hour around corners.

A. C. Judd, proprietor of the Hotel Elton, Waterbury, stated that his establishment would not pay expenses were it not for the motoring trade. His house had been erected at a cost of $400,000.

Representative Dunn, of Willimantic, considered the present law ample, if properly enforced. If a stronger penalty was needed, he was in favor of it. He referred to constables setting traps for the unwary motorists and collecting their $1.06 for so doing. By changing the law that feature would be introduced again.

Representative Griswold, of West Hartford, who introduced a bill providing for increased fees, stated that his bill was really the effort of Frederick E. Duffie. Mr. Duffie stated that he represented the West Hartford Grange, which has a membership of 300. "We know the law is violated outrageously and we are not all fools, although we were called that yesterday," he said. "There is no use in standing up here and calling us damn fools. There is no argument in that. We believe in taking half of the road and giving the motorists the other half. We believe that when we put up our hands for a motorist to slacken speed he should do so." Mr. Duffie had considerably more to say on the subject and has confirmed ideas regarding the proper regulation of motor cars. He is fair-minded in the matter and resides along the main highway in West Hartford, where the reckless element has in the past made it a race course.

Ex-Representative Allerton, of Middlebury, known as the father of the present law, favored the perpetuation of the present measure. He could not see how any specific speed measure would result in stopping any quicker than can be done under the present law.

He favored the present law in so far as it applies to speed. It has been proven by everyone who has gone into the question to any extent that an arbitrary speed law does nothing but result in traps being set

and subsequent fines for the motorists. He referred to the fact that in Darien under the old law $1,500 was realized in fines one Sunday as a result of the enforcement of the speed law. Governor Guild had told him that he wished Massachusetts would adopt just such a code as the Connecticut law as it exists at present.

It is a common impression in local motoring circles that something will happen to the present law. Those who make the laws are well aware of the fact that the innocent always suffer for the guilty, but nevertheless the harm has been done and someone must pay the fiddler. Many members of the legislature own and operate motor cars. Just how soon the matter will be put before the assembly for final action is a question.

GOVERNOR'S SIDE OF IT

Governor Crothers, of Maryland, does not agree with the motorists that the tax feature of the Swann bill is burdensome to the owners of motor cars in this state, and if he has his way the bill will be passed by the next legislature. He says: "The public does not fully appreciate the efforts of Colonel Swann. He has worked hard on the measure, studying the laws of other states, listening to all sides of the questions involved and devoting his time and energy to the matter absolutely without pay from any source. The motor car people are making the mistake of their lives in opposing the bill. They are agitating a matter in which they should co-operate, and agitation will react upon them if they are not careful. Of course, they have rights which should be guarded. They own valuable property, they have come to stay and they should be protected. But they must understand that they owe something to the state. The commission and myself are not trying to do something unconstitutional. This is not a matter of oppressive double taxation. The merchants pay a license tax in addition to their tax on real property they own and the street car company pays its license tax in addition to its general levy on its property. It should be understood by the motorists they are expected only to pay for their part of the damage done to our roads. It is not enough for us to raise money to build these roads; they must be maintained and revenue must be raised with which to do this. There is a return to the car owners in these roads. The toll gates are removed and better highways are provided. Both mean a saving to the men who own their cars. Then there is another matter to be considered. The farmers and country people generally have first call upon their own roads, and when they are put to inconvenience, when their teams break and run away, when the women are frightened and sometimes hurt by speeding motor cars, it is necessary for these machine owners to pay in some way for what they are alone responsible for. Life and limb must be protected from reckless car drivers. It takes money to equip a bureau for this purpose. There have been numerous accidents due to reckless and inexperienced driving in cases where men and boys, other than the owners of cars, are allowed to drive these machines. These abuses have got to stop."

BAR HARBOR CASE

The Bar Harbor squabble over motor cars using the roads in that summer resort on the Maine coast seems to have been settled, but like Banquo's ghost it may rise again. For example, at the annual town meeting last week when the question of excluding the cars came up in the town warrant much to the surprise of those interested on either side there was no fight, in fact the matter seemed to have been killed by its friends. However, one Maine motorist at the Boston show said that as the legislature has not yet passed the bill giving the town the right to exclude the cars the action of the town meeting cannot necessarily mean anything. In other words, the action was invalidated by reason of lack of authority, and to get the question settled it would seem as if a special town meeting must be called later after the legislature has finally determined that the residents may settle the problem.

OF INTEREST TO MAKERS

In one of the appellate courts of France the judges recently reversed a lower court's verdict which interests motorists and manufacturers alike. The case concerned a French physician in Poitiers, who had purchased a car, paying the manufacturers, who were located in the vicinity of Paris, the sum of 13,000 francs. Soon after he had the car in operation the owner found fault with it. Instead of taking the matter up with the manufacturers he sent the car to a repair shop of his own selection—this is important—and there the car was taken apart and the various troubles complained of by the physician were remedied. The repair bill amounted to 3,000 francs and the car seemed to be in good running order. Ten months after the purchase of the car the doctor, being still not satisfied, wrote to the manufacturers and asked them to take the car back and refund him his money plus the repair bill. The manufacturers answered they could not take the car back after 10 months had elapsed before the owner had made a complaint to them, that furthermore if he was not satisfied with the machine he should have advised them, the makers, that they might then have instructed him either to send the car back to them or told him to what repairman to take it. They had not given him instructions to have the overhauling done and consequently they did not consider themselves liable in any way. The doctor then brought suit against the manufacturers and the lower court decided in his favor. The manufacturers appealed to the appellate court, which practically decided entirely in their favor. It was held by this court that, as the defects complained of were not hidden defects—that is defects that could not be detected or seen—as the owner had repairs made at his own dictation without first calling the matter to the attention of the manufacturers, and as the owner had shown carelessness in the handling of the car and in its upkeep, that consequently he should be held responsible. However, as it has been fully shown by the experts that the car was not in perfect running condition when delivered to the physician the manufacturers were also held to account, having to pay 3,000 francs damages to the physician. According to article 1641 of the French civil code, with direct reference to motor cars, the salesman must guarantee the car from hidden or unseen defects. By hidden defects is meant such defects which a purchaser of average intelligence and knowledge of motor car matters could not find or see when purchasing the car. If the defect is apparent but is overlooked by the buyer then the latter has no recourse. If a buyer is not competent to detect possible defects he must be accompanied when purchasing his car by an expert of official standing. Hidden defects must be quite serious to make a car unfit for use in the law's sense. If the buyer of a motor car finds fault with the car's running he must not have it inspected or overhauled by any one else except the manufacturer of the car or somebody specified by the manufacturer. The buyer must give a written report as to the troubles of which he complains and the report must be made by an officer of the law assisted by a sworn expert on motor matters. The suit, if such is the intention of the owner of the car, must then be started without any delay.

COURTESY EXCHANGE PLANNED

If an act to amend the highway law as introduced by Assemblyman Robinson in the New York state legislature at Albany is passed there will be a mutual exchange of courtesies between New York and other states whereby an exemption from registration fees for non-residents will be the order. The amendment will constitute section 290 of the highway law, and is made to read as follows:

The provisions of sections 282 to 289 inclusive of this article shall not apply to motor vehicles owned by non-residents of this state, provided the owners thereof have complied with any law requiring the registration of owners of motor vehicles in force in the state, territory or federal district of their residence, and the registration number showing the inital of such state, territory or federal district shall be displayed on such vehicle substantially as in the preceding sections provided, and provided also that the state, territory or federal district of the residence of such non-resident owners exempts motor vehicles duly registered under the laws of, and owned by residents of this state, and their owners, from any registration or license fees or tax when operating in such foreign state, territory or federal district.

The act is to take effect immediately and has been read once and referred to the committee on internal affairs.

The Readers' Clearing House

EDITOR'S NOTE—In this department Motor Age answers free of charge questions regarding motor problems, and invites the discussion of pertinent subjects. Correspondence is solicited from subscribers and others. All communications must be properly signed, and should the writer not wish his name to appear, he may use any nom de plume desired.

IGNITION INFORMATION

INDIANAPOLIS, Ind.—Editor Motor Age—I have been informed that a six-cylinder car equipped with Bosch high-tension ignition was sure to give trouble, owing to the fact that the engine, when running fast, would miss sparking because of the fact that while the electrical spark is instantaneous the mechanical parts are not. In other words, will a Bosch low-tension make-and-break give more efficiency and less trouble?—G. M. C.

There are a great many six-cylinder cars equipped with Bosch high-tension ignition, which are not giving trouble. It is impossible to state whether a Bosch low-tension make-and-break will give more or less trouble. That entirely depends on the design of the make-and-break parts. There are six-cylinder cars with a make-and-break spark which do not give trouble, and others do. The same holds good with the high-tension. The question of design and workmanship is the big factor. It is a fact that some makers of six-cylinder cars who use the make-and-break spark on their four-cylinder types, have added the jump-spark system on their six-cylinder models. Again, it is a matter of design, one maker by his superior design being able to overcome the defects of another.

SULPHUR LIFE OF RUBBER

New York—Editor Motor Age—Through the Readers' Clearing House will Motor Age tell me if there is any preparation I can apply to make rubber in my tires more elastic? I have used the tires on my car about 3 or 4 years, and, although they have not been used a great deal, the rubber seems to be very dry and inclined to crack. Is there any advantage in having a high-speed engine on a one-cylinder car, other than it runs more smoothly?—David J. Hofer.

There is no relief for you as regards your tires. The life of the tire is the sulphur which has to be put in when the rubber is in crude state and flow while the process of vulcanization is taking place. To do anything with your tires they would have to be recompounded and reclaimed, which would cost as much as new tires, and when you got through they would not be as good as they were when you first bought them. The value of a high-speed one-cylinder engine is, as you suggest, although one or two makers have brought single-cylinder engines with medium crankshaft speed which are very smooth runners and quite free from vibration. In the case of the Brush this has been accomplished by balancing weights carried on a shaft within the crankcase and which is gear-driven from the crankshaft. In one foreign car, namely, the de Dion, which is a foreign leader in single-cylinder construction, the flywheel is contained and balancing accomplished without balance weights on an additional shaft.

KEROSENE DOES MUCH GOOD

Newark, Mo.—Editor Motor Age—Is it injurious to allow kerosene to stand over night in the cylinders of a gas engine which are badly sooted or carbonized? If not, how often should it be done when the car is running every day?—E. M. Rudd.

The use of kerosene, as well as many carbon destroyers now on the market, has been proven beneficial. With kerosene a tablespoonful poured into each cylinder at the end of the day's run and left over night will give good results. This policy is followed by many demonstrators who are using cars constantly. Care must be taken, however, not to allow too much kerosene to get into the oil in the crankcase, so as to unduly weaken it and reduce its efficiency. Makers who have used decarbonizers have found them particularly successful. Some have followed the policy of mixing the decarbonizer with the oil in quantities varying from one-half to three-quarters of decarbonizer to a gallon of oil, which has been found to operate successfully. The general policy with decarbonizers is to follow the directions given by the manufacturer.

COST OF SIXES AND FOURS

Deer Lodge, Mont.—Editor Motor Age—Why does a four-cylinder car cost more than a six-cylinder? Referring to the Matheson company in particular, its four-cylinder machines range from $1,000 to $1,500 more than the six-cylinder with the same horsepower. In a touring car, which is more durable and has more power, the four or six-cylinder car? What would cause a dead-knock in motor running at 25 to 30 miles an hour, which motor runs smoothly at any speed below this? Pistons and cranks have been adjusted and are all perfectly tight. It sounds as if something were hammering. The wires are in good shape.—A Subscriber.

A four-cylinder car ordinarily does not cost more than a six, and in the Matheson case you suggest the construction of the six is entirely different from that of the four-cylinder cars with which you compare it. The four-cylinder Matheson car uses make-and-break ignition and has a camshaft carried above the cylinder head; it uses a pump type of carbureter and a four-speed selective gearset mounted on the frame. The six-cylinder Matheson employs a motor with the camshaft contained within the crankcase and the transmission incorporated within the rear axle. It uses a conventional carbureter and jump spark ignition system. All matters considered, a six would cost more than a four. As to whether a six-cylinder or four-cylinder car has more power depends on the size of the cylinders. The six gives ideal torque, or constant movement, in that there is a power impulse at every 120 degrees of crankshaft revolution; that is, three impulses of the crankshaft per revolution. On the four-cylinder car there are but two. Perhaps some readers of Motor Age can give information on the knock of which you speak.

WOULD BE POOR CONSTRUCTION

Peru, Ind.—Editor Motor Age—Would it be a good idea to place four or five small lugs around the valve seats of a valve cage to help guide the valve? It would save much wear on the regular guide if the valve were in the cylinder head and operated by a rocker arm. Of course allowance should be made in building the motor for the slight decrease of area in the valve opening.—Subscriber.

This would be a poor construction. These lugs would be exposed to the combustion heat and would expand. It would be impossible to lubricate, and there would be danger of the valve sticking. Where valves are placed in the cylinder heads, it is true the guide of the valve stem is short, but one or two makers are now designing an upward conical projection on the valve cage, which affords a longer bearing for the valve stem. It is possible to lubricate the stem under such conditions, but utterly impossible to lubricate the lugs you speak of.

NOW THE CRESCENT RIM

Detroit, Mich.—Editor Motor Age—Through the Readers' Clearing House will Motor Age inform me whether or not the Harburg Tire Co., of New York, is still in business, and if its demountable rim is patented in the United States? On page 14, issue of December 14, Motor Age stated that the Excelsior motor cycle attained a speed of 60 miles per hour at 375 revolutions per minute of the motor. How is this speed accounted for, when these machines are geared five to one with 28-inch wheels?—William B. O'Brien, Jr.

The Harburg Tire Co. is still in business and its demountable rim is patented in this country. It is now known as the Crescent rim. As to the speed of the Excelsior motor cycle, there was no De-

ember 14 issue of Motor Age, the closest to it being December 17. A search through the issues of that month fails to disclose any such statement as you claim was made by this paper. Probably you are mistaken as regards the publication. As to the gearing, when any speed attempts are made by the Excelsior, of course, the gear ratio is changed, it often being as low as three-to-one. The five-to-one ratio is intended for touring purposes and not for attacks upon Father Time.

SPEED OF MAXWELLS

New York—Editor Motor Age—Through the Readers' Clearing House, will Motor Age inform me what speed was attained by the Maxwell runabout in the light car race at Savannah, November 25, 1908?—D. J. H.

Four Maxwells competed in the light car race at Savannah and all of them were running when the race finished, although only two of them had completed the full distance. The Maxwell driven by See averaged 45.5 miles per hour and the one piloted by Kelsey 45.1 miles per hour.

FAVORS SPARK GENERATOR

St. Ansgar, Ia.—Editor Motor Age—Regarding several inquiries appearing in Motor Age concerning ignition systems, I think it would be just and proper for Motor Age to publish a comparison of the systems used, stating their peculiarities and the advantages of each over the others. As the vibrator coil was formerly mainly employed in the jump-spark system, and to some extent appears on cars of recent manufacture, it may be well to state that its inherent faults were the cause for the perfection and adoption of the high-tension magneto and the Atwater Kent spark generator. It is practically impossible to set four or more vibrators so that all charges will be fired with each piston in the same relative position when an engine is running at medium or high speed. This would appear to be the case with the magnetic plugs, although I cannot state this positively, having never tried them. The low-tension make-and-break system is less liable to such faults, but will in time get out of synchronism, due to wear of the operating parts and the burning away of the contact points within the cylinders; a low-tension high-amperage current being much more destructive than the high-tension with its low amperage. The high-tension magneto is considered superior to either of the above mentioned types, and certainly is far ahead of the multiple coil. Wear of its bearings will throw it out of perfect synchronism, but it requires little attention and its wiring is as simple as the make-and-break, without the added complication of the hammer spark operating mechanism and special cylinder castings. Most of the latest models furnish a spark at slow motor speed sufficient for starting, and some even start the motor on the spark; but excessive current at high speed, sufficient to burn out the plugs, is a common fault of most of them. Testing individual cylinders is difficult, and few drivers are able to remedy the least trouble with them, as it is necessary to practically dismantle the magneto to get at its parts. The Atwater Kent spark generator seems to be the only system with all the bad features eliminated, unless installing a new set of dry cells every few thousand miles could be considered such. The manufacturers guarantee a mileage of from 1,500 to 2,000 on a single set of six cells, and the driver of a Dorris car informed me that he had used the same set for over 5,000 miles. The excessive mileage secured by dry cells is due to the fact that no current is wasted, the generator producing but one spark for each charge, whereas the vibrator gives from three to eight. To drive the generator requires less power than for the ordinary timer, as the writer has spun the shaft with the thumb and finger, producing several sparks in succession. There is but one adjustment to be made, and the distributer and timing mechanism can be entirely exposed with the generator operating. There are no moving wires; all sparks are exactly alike and perfectly synchronized, and it can not fire running backwards. When the generator receives the attention it deserves, the high-priced, high-tension magneto will become a thing of the past, being supplanted by its superior. Its popularity is shown by the fact that it has been adopted as standard equipment by those manufacturers who have tested it; some making it their only system. The writer has nothing to sell, and no interest in any manufacturing company, his object in writing this being to aid his fellow motorists and help out the survival of the fittest.—Guy B. Carroll.

WAS A TYPOGRAPHICAL ERROR

Seattle, Wash.—Editor Motor Age—In issue of January 14, Motor Age gave specifications of the cars at the Madison garden show, and I note that it quoted the Packard 18, A. L. A. M. rating, 26 horsepower. In the issue of February 4, in an article entitled "Horsepower of Packards," page 76, Motor Age stated that the Packard 18, according to A. L. A. M. rating, is 36.1 horsepower. Why this discrepancy?—A Subscriber.

Giving the Packard horsepower as 36.1 was a typographical error. It should have been 26.4 horsepower.

OIL COOLING

Davenport, Ia.—Editor Motor Age—Will Motor Age tell me whether oil could be used with good effect in the honeycomb radiator on a model 2-20 Maxwell, and where could such oil be purchased?—W. J. Brown.

Motor Age questions if oil-cooling would be a success because of the thermo-syphon. In several cases where oil has been used for a cooling medium, it has been found that the pump was not adequate to take care of it. Trouble with oil-cooling in some cases has been due to the expansion of the oil which is considerably greater than that of water. One or two experimenters have, in fact, ruined their radiators, due to this expansion.

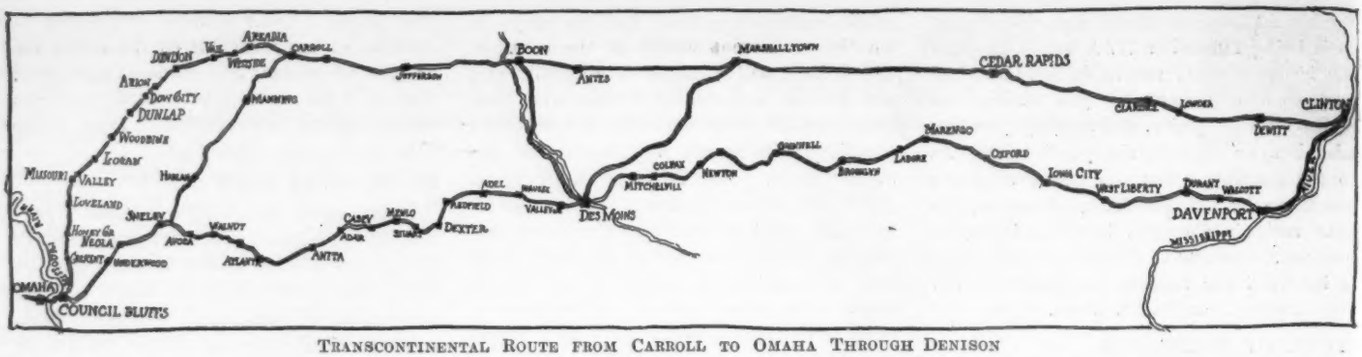
TO PREVENT RUST

Birnamwood, Wis.—Editor Motor Age—Through the Readers' Clearing House will Motor Age advise of the best application for wheel rims and tire rings for the prevention of rust, etc.? Would Motor Age advise the use of either varnish or shellac?—C. W. Van Doren.

Tire experts agree that powdered graphite and glycerine make the best preparation to apply to wheel rims and tire rings for the prevention of rust. This is compounded by taking a small quantity of powdered graphite and mixing it with glycerine until it becomes a thick paste, when it is applied with a brush. Crude glycerine can be used, which will make the preparation cost less.

BATTERY PROBLEM SOLVED

Portland, Ore., March 5—Ever since motor cars have been shipped to the north Pacific coast, particularly near Portland, owners have experienced continuous trouble with their storage batteries. These would run down and become practically useless, sometimes when the car had not been driven more than 150 miles. So serious did the matter become at one time that several companies adopted the expedient of shipping their cars to northern Pacific coast points without batteries and having them supplied on the arrival of the shipment at its destination. Battery experts and motor car experts tried without success to determine the cause of this rapid deterioration. In the meantime magnetos were in demand and have been used altogether as a source of ignition. Recently a representative of the Pierce-Arrow Motor Car Co., of Buffalo, was in Portland, and determined to have a try at the problem. He spent several hours in studying probable causes, but did not come near a solution until one afternoon when he was walking along a new street and noticed a little girl playing in the sand. She had a small magnet and when she placed this near the surface of the sand pile a number of the grains would adhere. The Pierce-Arrow man immediately equipped himself with some magnets and made trials with the sand and dust that had sifted in on the top of the batteries. A few experiments were all that were necessary to show him that it contained a high percentage of iron, sufficient to establish a short circuit between the poles. Not only that, but the fine sand and dust made its way into the acid solution and impregnated it to such an extent as to render the best storage batteries useless after they had been in commission but a short time. A remedy was soon found for this, and it is probable that owners along the northern Pacific



TRANSCONTINENTAL ROUTE FROM CARROLL TO OMAHA THROUGH DENISON

coast who have had trouble since the earliest days of motoring will now be able to secure as much service from their batteries as motorists in localities where sand is just plain sand.—G. Davis.

CURTISS MAKES SMALL MOTOR

Dalton City, Ill.—Editor Motor Age—In Motor Age, February 25 issue, G. A. R., of Deming, N. M., wanted to know where he could get an air-cooled motor of 4 or 5 horsepower. The Curtiss Motor Cycle Co., of Hammondsport, N. Y., makes a motor of that type.

ADVANTAGES OF FRICTION DRIVE

Platteville, Wis.—Editor Motor Age—In the February 4 issue of Motor Age was a communication from D. O. Babcock relative to friction transmission, and in answer to his inquiry relative to the advantages of the friction transmission, I have to say that these advantages are the absence of noise on all speeds, simplicity of changing speeds, safety, and most important of all, the great range of speeds or ratios. I grant there is a frictional loss, as per his diagram, and loss in the several bearings, but he neglected to state the amount of power lost in transmitting through the planetary type. I fear that we, who have become accustomed to handling the planetary gear, lose sight of the vast number of times we are compelled to tighten up our low speed bands and high-speed clutch, which is made necessary by the frictional wear and consequently lost power, and we are very liable to forget just how many times we are compelled to use our slow-speed pedal. I have found it necessary to use my slow speed gear, and on several occasions have used my reverse gear in descending very steep hills where brakes were not equal to the strain. There are moments when one sincerely wishes he had a friction transmission, knowing well that he could not injure it by using the reverse. Again, in ascending hills, how often we wish we had an intermediate or a broader range of speeds. The hill is probably a little too steep and long for the direct drive, and to change to the low takes up a lot of time, gasoline and patience. Then is when the friction shines, as you simply shift your change-speed lever to the position that will give you the correct ratio between engine and load, and you are not compelled to race your engine and make time or strain it by trying to pull up on high. Again, the friction-driven car can be driven slower than any other car, and it can climb hills no other machine can negotiate, owing to the range of speeds from zero to high. One can readily see by examination that tremendous power can be derived by placing the driven disk just past the center of the driving disk. In conclusion, I will relate the incident which converted me. My father and a demonstrator were driving in a Cartercar at 30 miles per hour, as indicated by the speedometer. When approaching a crossing, a street car stopped, a passenger alighted from the car and ran in front of our party. It looked as if it was a case of running down the man or ramming the car, but due to the fact that a friction transmission was employed, the driver simply pulled his change-speed lever into the reverse position and applied his pedal, resulting in the car stopping in about a length and a half—the pedestrian was unharmed, the motor car was uninjured and all were loud in their praises of the car and its driver.—W. G. J.

VARIETY OF QUESTIONS

Andale, Kan.—Editor Motor Age—Will Motor Age tell me what anti-freezing solution could be used in a generator? Also what material is used as packing in the crankcase—that is, between the upper and lower halves? How can a person tell when he is getting proper compression in the cylinders? Would a leather covering for tires be a success? It is said that a too far advanced spark lever causes knocking in the motor. I have a 1908 Buick, model 10, fitted with a Kingston carbureter and coil, also storage battery, and I have noticed that if the spark lever is not advanced enough such knocking results. This is when my car is running slowly. What is the cause? When the car is standing why will the motor miss, and when starting on slow speed it will do the same, but on high speed run perfectly?—Kansas.

Frequently paper is used as a packing between the halves of the crankcase. You can discover if any of the cylinders have too low compression by comparing the power required to slowly turn the crankshaft. The only method, however, to determine if the compression in all four is too low would be to secure a compression gauge, which can be threaded into the spark plug opening. The leather covering would be short-lived and would prove expensive. Too great advance of the spark causes knocking, as you suggest. The knock when not sufficiently advanced may be due to the heating of the motor. The missing on low speed is due to insufficient mixture. Your car is adjusted for medium-speed work and not for the particularly slow work to which you refer. You could adjust the carbureter to prevent missing at this slow speed, but there would be little gained by it.

CAR FOR SANDY ROADS

Mesilla Park, N. M.—Editor Motor Age—Perhaps the Readers' Clearing House can help me out, as I am undecided, before purchasing a car, as to the following points: Out in this country where a car can be used the year round, we have roads that are noted for their chuck holes and deep sand. I want a car that will be good for several years of steady service. Other things being equal, is not a light car better for our roads than a heavy one? Does not a car with the engine under the body have an advantage in sand over the car with the engine under the bonnet? Is there not greater risk of a four-cylinder car, with so much of the weight forward, being stalled in deep sand, than a two-cylinder with the engine under the body and the weight thus more evenly distributed? Two-cylinder cars seem to be used extensively on motor routes in this sandy country. Do they not possess advantages over the four-cylinder cars, in a country where a repair shop may be 50 miles distant, by reason of their greater simplicity and less chance of break down? Is any one style of transmission preferable for roads with frequent sandy stretches requiring frequent changs to low gear?—F. E. Lester.

A light car is preferable to a heavy one for all ordinary use, as it is easier on tires and being light is less of a load for itself. Regarding the relative merits of two and four-cylinder cars in sand, the ordinary four-cylinder car has the weight sufficiently well distributed over the front and rear axles that there is little trouble due to the stalling in sand, of which you speak. The style of transmission most suitable for roads with frequent sandy stretches is one with low speed and the gears giving direct drive on low speed. The best style of transmission for this would be one offering direct drive on low speed. This

would be difficult to obtain and a style of sliding gear transmission, in which the countershaft transmits direct to the drive shaft of the rear axle is preferable, in that the loss of power would be less than in the ordinary gearset, where the power is transmitted from the mainshaft to the countershaft and then back to the mainshaft.

THE HORSEPOWER PROBLEM

Twin Falls, Idaho—Editor Motor Age—Through the Readers' Clearing House will Motor Age tell me what is the difference between the A. L. A. M. horsepower and the actual horsepower of four-cycle and water and air-cooled engines. I notice that but few makers of engines will give a guarantee that their engines will develop the horsepower that they rate them at. Why is this?—J. B. Hall.

The A. L. A. M. rating is based on the following formula:

$$H\ P = \frac{D^2 \times N}{2.5}$$

The actual horsepower, however, is frequently determined by brake tests, or dynamometers. The A. L. A. M. formula is based on the piston speed of 1,000 feet a minute. Some motors are designed to give the greatest efficiency at speeds of from 1,400 to 1,500 piston feet a minute, and so such maker would guarantee what the horsepower of his engine would show at that speed. On the other hand, several long-stroke motors have a piston speed not over 800 feet per minute; consequently, their rating might be lower than the A. L. A. M.

CARBURETER INFORMATION

Platteville, Wis.—Editor Motor Age—Will Motor Age give me the address of the manufacturers of kerosene carbureters, or combination carbureters? Are there any books published on the subject of kerosene for motor car use? I would also like the name of the most reliable book, and its author, on the construction, management, installation, wiring and repair of magnetos.—William G. Jarrett.

Kerosene, or combination, carbureters are not manufactured for sale by any American manufacturers. Some foreign makers build kerosene and heavy oil carbureters, these having been used on trucks and stationary engines. A good book on ignition purposes is "Motor Ignition Appliances," by T. H. Hawley, printed by the Cycle Trade Publishing Co., Ltd., 19 and 21 Wilson street, E. C., London, Eng.

THE PROPER WIRING METHOD

Danville, Ill.—Editor Motor Age—As a repairman I find batteries wired both ways—positive terminal to switch, and negative terminal to switch. Through the Readers' Clearing House will Motor Age answer the following questions: What is the correct way to wire up a set of dry cells or a storage battery in a motor car? If a positive terminal is to be connected to the switch on the coil, what would be the result to batteries or coil if negative terminal should be connected to the switch instead of the positive? If a set of dry cells and a storage battery are to be used should the positive terminals of both be connected to the switch on the coil?—Barton Parish.

It is correct to connect the positive wire from a set of dry cells or a storage battery to the switch if the wire from the switch leads to the coil. It is also correct to connect the negative wire to the switch if the wire from the switch is grounded, forming the ground connection between the motor and the negative of the battery. If the negative terminal of a battery is connected to a modern coil instead of the positive the result would be that owing to current having to flow in the opposite direction, the possible increase in the resistance of this indirect connection would probably reduce the efficiency of the coil. Answer to the last question is contained in the first answer.

MOVING PICTURES FAST

Palo Alto, Cal.—Editor Motor Age—Last year I saw some moving pictures of the grand prix races, among which was one showing how the cars skidded on a turn in the course so that they faced in the direction from which they came. Does Motor Age know if this really happened? Why were the foreign cars in the American grand prix rated so much higher than the American cars of nearly the same bore and stroke?—P. B. Roberts, Jr.

The pictures you saw of the grand prix race were undoubtedly authentic, but as is often the case with moving pictures, the speed of the cars as shown in the pictures was greater than that in the race. Pictures sometimes show a car taking a corner at a speed much in advance of the real speed. The European cars were rated high for the simple reason that nearly all racing cars are so rated, in order to attract attention. It frequently happens that a racer has been estimated from 60 to 75 per cent too high. Often these motors when speeded up to high crankshaft speed will show the horsepower they are rated at.

BRENNAN MOTOR TROUBLE

Syracuse, Neb.—Editor Motor Age—Will Motor Age, through the Readers' Clearing House, tell me how to make my two-cylinder opposed Brennan motor work more satisfactory? I am unable to keep any oil in the crankcase. The required amount of oil, used according to instructions furnished with the motor, does not last over 10 miles running. Immediately after using the oil the motor runs quite smoothly, but smokes badly until car has traveled 6 or 7 miles. The motor has a cylinder size of 5½ by 5 inches, and was sent direct from the factory without any crankcase release valve fitted. There always seems to be a surplus of oil in the combustion chamber, more especially in the front cylinder; the compression is good; bearings, where the connecting rods are joined to crankshaft, often become loose; and every time I drain the crankcase I find small pieces of babbitt metal in the bottom of it. I cannot discover any leak in the case.—W. C. L. Jr.

Your motor requires new piston rings, which is indicated by the oil getting into the combustion chamber. It is impossible for the compression to be good and so much oil pass the pistons unless the oil level in the crankcase is much too high. Feed less oil. The small pieces of babbitt are from the bearings of the crankshaft or lower connecting rods.

CLEARING HOUSE FOR READERS

Kenosha, Wis.—Editor Motor Age—I am a reader of Motor Age and enjoy its columns very much, especially the Readers' Clearing House. I think Motor Age is doing its readers an injustice in not giving them correct information and permitting scheming advertisers to enter these columns. February 11, page 47, H. A. Sanderson asks about his sparker, and the answer is misleading to one trying to understand the workings, etc., of coils and magnetos. Why must a distributor be used with a non-vibrator coil? Why lead your readers to start a supposedly interesting subject like that on page 21, issue of February 25, entitled "Facts About Grease" and find out at the finish that an ad had been worked on him. Motor Age has its classified ad columns, and they are good. Keep them there, and the readers of these pages will continue to be interested.—Kenosha.

TRANSCONTINENTAL ROUTE

Denison, Iowa—Editor Motor Age—I note by Motor Age, issue of March 4, that the transcontinental route has been changed somewhat in Iowa. In the past this route was through Denison. From the map I am forwarding you will note the route by way of Carroll to Denison, and Council Bluffs to Omaha, which is the route used by the New York-Paris racers, as well as many others. Denison has good hotels and garages, and there have been several sales here this year. I hope the Glidden tour will come this way, as the roads at that time of the year are always good. The transcontinental route is a good one in this section of Iowa. Last fall there was a run made from Omaha to Denison in less than 2 hours.—A Reader.

Denison, Ia.—Editor Motor Age—Motor Age made an error in its map of the transcontinental route. Instead of going south to Carroll, the route should be west to Missouri Valley and thence south to Council Bluffs. This section has been slow to take on motor cars, but this winter one dealer has sold ten cars, and there are now three in town.—E. C. Chamberlin.

The SELECTION of a RADIATOR

By Joseph E. Lewis, M. E.
Part I

THE manufacturer of motor cars is offered a variety of different types of radiators from which to select, and in deciding which type to adopt, has several important considerations to make, namely, appearance, price durability, and efficiency. In addition other things must be considered, among which could be included the reputation of the manufacturer for producing good merchandise as well as his ability to make desired deliveries. Granted that these conditions are satisfactory, the decision of the car manufacturer is then left to the merits of the radiator.

Appearance is an important factor, and frequently depends as much upon the general outline and proportions of the radiator as on anything else. The radiating part, however, occupying as it does a conspicuous position in the car, generally comes in for a critical examination. The popular fancy must be heeded, and this may create a demand for a particular type, thereby making that one a good seller for the car.

Changes in Types

Not long ago the term Mercedes was accepted by many as indicative of all that was good in radiators. The cellular or honeycomb type was at that time in great demand, and undoubtedly added to the selling quality of many cars equipped with it. It was, in brief, considered indispensable on many high-priced cars. Conditions change as time passes, and the division of the radiator field between cellular and tubular has undergone many changes in the last few years. At the present day not a few manufacturers of tubular radiators, by simple devices, have obtained a construction whereby the radiator has a cellular appearance, a condition which has no doubt been dictated by the desires of the buyers. At present there is a strong tendency towards the return of the original tube and fin type radiator, modified to meet present day requirements. It is noticeable that people are coming to appreciate the fact that the main function of a radiator is to cool, which thought should be uppermost in the mind of a manufacturer.

The question of price has to be considered, just as much as it has in any other part of the car, but it is too frequently made the major deciding point. The fact is the radiator prices are now about as low as it is possible for them to go, and the difference in price of the well-known makes is very small, so small in fact, as not to be factors in determining which type is the more meritorious.

Durability in a radiator depends upon a number of things, foremost of which is design. One design to have a multitude of soldered joints is more likely to give trouble than one which has but few, and herein lies the inherent features of some types. It may be set down as a basic principle that the fewer the joints, the more durable the radiator, and the less likelihood of its developing trouble. Good workmanship and proper construction, with joints seamed or riveted when necessary, are important, but this is so obvious that it calls for only passing mention.

The use of suitable material aids in increasing the life of a radiator, and in this connection experience has revealed some interesting facts. Copper, or a composition rich in copper, known as soft bronze, or gilding, is the most suitable material for the tubes or water passages. Ordinary yellow brass is very likely to give trouble, because of its tendency to deteriorate with time, or to crack open in use. Furthermore, it is "hot short," becoming brittle at soldering temperatures, so that trouble is experienced in the process of manufacturing as well as in repairing. The very thin grade of metal used in the tubes and water passages causes these properties of yellow brass to be more troublesome than where heavier gauges are employed, such as in tank construction. In tank work ordinary brass is entirely suitable.

Use of Brass in Fin Type

Brass may also be used for the fins of a radiator of the tube and fin type, since no leak or other trouble can be caused by surface imperfections or cracks. Even tin plate may be used successfully for fins, since it does not come into contact with the cooling water, and hence has no tendency to corrode if properly tinned and painted. In fact, tin fins have been in use for a long time upon some well-known makes of cars. It may be argued that brass and tin are unsuitable for this use because of their lower conductivity for heat as compared with copper. This may be true in a small degree, but there are some popular fallacies in regard to this which will be discussed more fully under the head of efficiency.

There are certain parts of the radiator which are not visible when it is in position on the car, such as the backs and bottoms of the tanks, and it might be supposed that these parts could be made of heavy tin plate or of terne plate, or of galvanized iron, in order to save expense. Such practice, however, is bound to lead to trouble later on. The hot water in the tanks coming in contact with both brass and iron soon causes the latter to corrode until in a short time it may become pitted way through the metal in numerous places, causing leaks. This action is probably due to electrolysis, and often takes place so rapidly as to cause serious difficulty within 1 year. The writer has seen a great many cellular radiators made with corrugated galavnized iron plates in the sides of the case under the brass jacket to stiffen it, and so located as to be immersed in the circulating water. Many of these coolers went back to the factory for repairs after having been used for one season or less, and the galvanized iron was invariably found to be corroded wherever it was examined. In some instances where coolers had been in use for two or more seasons these pieces of iron had almost entirely disappeared. Undoubtedly, however, galvanized iron may be used successfully in radiator construction if it does not come in contact with the water. Separate galvanized iron tanks have always been used successfully in connection with the old fashioned style of tube and disk radiator, but in this case the tank and the radiator are usually located some distance apart and the connection between them is composed partly of rubber hose so that they are partially insulated from each other, which probably prevents electrolytic action to a large extent.

Supports of Radiators

The manner of supporting the radiator on the car is of importance as affecting its length of life and therefore may be briefly referred to in this connection. The supports should be neither too flexible nor too rigid. Many radiators are so held as to be subjected to severe strains due to the twisting of the frame of the car. The result is sure to be a large amount of trouble from leaks. This is very likely to be the case where the radiator is supported by side brackets bolted rigidly to the side frames. We have recently seen

a radiator supported in this way, however, where the difficulty was overcome by placing spiral springs under the brackets, so that the radiator rested upon the springs instead of directly upon the frame. This arrangement, if correctly worked out, introduces the necessary amount of flexibility, and should prove successful.

Three-Point Suspension

Probably the most common method of support, and perhaps the best, is by means of a three-point suspension effected by bolting the radiator at the bottom corners to the front cross member of the frame of the car and by running a stay rod back to the dash from the top of the radiator at the center. The bottom of the radiator ought to rest upon rubber or leather washers or upon a pad of soft wood. A single stay rod running back to the dash is better than two stay rods at the sides running down to the side frames at an angle, since this latter arrangement may throw severe stress upon the radiator if the side frames of the car twist slightly out of parallel on rough and uneven roads.

Where there is no cross member for the radiator to rest upon it may be supported in a strap iron sling, which takes the place of the cross member for that purpose, and is probably even a better arrangement. A piece of iron 3 inches or 4 inches wide by $\frac{3}{16}$ inch or $\frac{1}{8}$ inch thick is suitable for this purpose.

Fully as important as durability is the question of efficiency in deciding regarding the relative merits of several radiators. Perhaps efficiency may even be said to be the most important consideration of all. One seldom hears any complaint because the radiator has more than sufficient capacity, while on the other hand, one of the commonest troubles of the motorist is overheating. It is not enough that the radiator should be just able to take care of the engine under favorable conditions with an expert driver. On the contrary, the radiator, as well as every other part of the car, must be fool proof, or as nearly so as possible. And this means not only that it must be strong enough and durable enough to withstand hard usage, but it must also have surplus capacity sufficient to prevent overheating under very bad conditions, such as extremely hot weather, muddy or sandy roads, hill-climbing, etc., when at the same time the careless or ignorant driver is burning gasoline and oil in such a way as to generate more heat than power, perhaps with carbureter out of adjustment, cylinders foul with carbon, and ignition faulty.

Radiating Area

The radiator, therefore, which will radiate the most heat per square inch of front has a very strong argument in its favor, especially as the available front area is usually limited by the requirements of the general design. It frequently becomes absolutely necessary to get the maximum amount of cooling out of a given front area. Increasing the thickness of a radiator beyond a certain limit will not do much good. We shall present some figures and reports of tests relative to the comparative efficiency of radiators of the same construction but of different thicknesses in a later article.

The materials used in making a radiator have some effect upon its efficiency, but as already intimated, this effect is not so great as might be supposed. The question of what material to use is more properly decided with reference to durability than by any consideration of efficiency. Of course everyone knows that copper is a better conductor of heat than brass, while brass is better than iron or steel. This would apparently lead to the conclusion that a copper radiator is necessarily more efficient than one made of brass or tin plate.

The fact is that almost any metal will conduct heat faster than it will radiate it, provided that the distance which the heat has to travel through the metal is not too great. The main problem, therefore, with reference to the radiator is one of radiation rather than of conductivity, and radiation depends more upon the nature and condition of the surface than it does upon the kind of metal. It is well known that a polished surface is a good reflector but a poor radiator, while a rough surface radiates much more readily. Likewise a black surface radiates more heat than a white one.

If the radiator is properly designed so that the heat has only a short distance to travel through the metal in going from its source in the water to the point of its radiation into the air, any metal will conduct it from the one to the other faster than it can be radiated, so that the greater conductivity of copper would not result in a measurably greater radiation. Of course it will be recognized that the greater the distance traveled by the heat through the texture of the metal the more the benefit to be derived. But take the cellular radiator, for example, where the heat travels only through the thickness of the metal on its way from water to air, or through a distance of, say, .007 of an inch. It is hard to conceive of any particular advantage to be gained here from the greater conductivity of one metal as compared with another. Even in the tube-and-disk type of radiator the heat travels readily to the outer edges of the fins and unless the fins are of excessive width it is doubtful whether it would be possible to direct any greater radiation from copper than from brass, or even from tin.

Transfer of Heat

The reason for this lies in the fact that by far the greatest resistance to the transfer of heat from the water to the air occurs at the surfaces of the metal, that is, at the inner surface, where it passes from the water to the metal, and at the outer surface, where it passes from the metal to the air. Even if these surfaces are clean and free from mud, grease or other foreign matter, they still offer more resistance to the passage of heat than the fabric of the metal itself, but when foul, this resistance is increased until it becomes the principal obstacle to the efficient operation of the radiator. It follows that both the inner and outer surfaces should be frequently cleaned in order to secure the best results in operation.

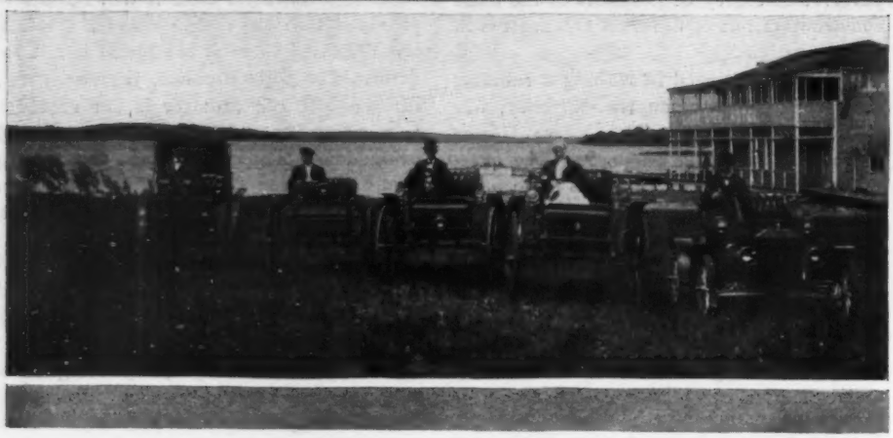
The efficiency of a radiator, therefore, depends chiefly upon the proportions and arrangement of parts, the relative sizes of air and water passages, etc. It is in the determination of these proportions that much may be learned by the use of a suitably designed testing apparatus such as will be described, together with a record of some results obtained, in other articles.

European Chassis Prices

Paris, March 1—Data compiled at the recent Paris salon affords an interesting comparison of the prices of chassis and complete cars of European construction and those manufactured in the United States. In most instances European makers quote their prices for four and six-cylinder cars on the chassis only, which sometimes does not include even the tires. Such instances, however, are exceptions. The price of the one and two-cylinder cars most always is for the car completely equipped. However, many makers furnish tires which are not guaranteed. Those who do, however, are in the minority. Four-cylinder cars of French construction without equipment list as follows:

H.P.	No. of chassis	Average value	Lowest	Highest
8	9	$1,098	$ 935	$1,300
10	15	1,450	1,080	2,000
12	32	1,482	960	2,000
14	12	1,666	1,120	2,400
15	13	1,943	1,200	2,400
16	10	2,012	1,200	2,600
18	16	2,255	1,550	2,700
20-22	25	2,612	1,860	3,400
24-25	16	2,616	1,170	3,100
28	8	3,150	2,100	3,600
30	12	3,108	2,500	3,600
35	14	3,328	2,300	4,200
40-45	12	3,741	2,980	4,400
50	7	4,128	3,200	5,000
60	4	4,450	4,000	5,000
70-80	3	5,000	4,400	5,600
Four-cylinder chassis of other European construction:				
8-10	4	1,297	1,140	1,500
12	5	1,568	1,300	1,900
14	6	1,773	1,600	2,000
15-16	7	1,750	1,300	2,550
18	11	2,125	1,800	3,200
20-25	7	2,571	2,200	3.000
28	6	2,946	2,100	3,800
30	7	3,205	2,700	4,000
35-40	11	3,680	3,000	4,000
50	5	4,420	3,600	4,900
60-80	7	5,464	4,600	6,800
Six-cylinder chassis of French construction:				
20-30	15	3,133	2,200	4,400
40-50	14	4,227	2,980	5,200
50-60	7	5,171	3,000	7,000
Six-cylinder chassis of other European construction:				
20-30	2	3,600	3,200	4,000
40-50	7	4,207	3,500	5,000
50-60	5	4,960	2,800	6,400
Two-cylinder complete cars of European construction, all but one being French:				
8 to 10	25	1,127	846	1,600
One-cylinder complete cars of French construction:				
7 to 10	30	857	580	1,180

From the Four Winds



HOLSMANS FIGURE IN NORTH DAKOTA FAMILY REUNION

Hartford Show Profits—The recent Hartford motor car exhibition will net the exhibitors a dividend of about 40 per cent. The report of the show committee will be submitted to the dealers' association at a meeting next week.

Atlanta Climb Billed—The annual hill-climb at Atlanta, Ga., will take place March 27 and will be made up of seven events. This will be the third climb of the Fulton County club, and seventy-five entries are looked for. There were forty-five last year. The Stewart avenue hill will be used as usual. This gives a straight run of about ⅞ mile, up a stiff grade.

Fighting Garages—Members of the Milwaukee common council are proposing all sorts of radical measures to regulate the location of garages, since the recent fire which destroyed the Sanger garage on Farwell avenue, Milwaukee. One alderman would prohibit the erection of garages within 300 feet of residences. In Milwaukee the garage has become a necessity in the fashionable residence districts, because of the desire of owners to keep their cars in a public garage rather than individually. The garages in these districts are all architectural models and preserve the beauty of the avenues and boulevards. A hard fight will be waged on these measures.

Big Shipment of Mitchells—One of the largest shipments ever sent into Omaha was that of the eleven car loads of Mitchells received a few days ago by the Coit Automobile Co. The shipment was a hurry-up one, and the eleven freight cars were put through on express time.

Motor Craftsmen, Not Chauffeurs—The Denver Motor Craftsmen's Association is a new organization in Denver. It has a membership of about seventy-five of the best chauffeurs in the city. The association will not attempt to regulate wages, but allows members to exercise their own judgment. Members are warned not to use their employers' cars without permission, commissions from repair men and dealers will be discouraged, and the general betterment of drivers will be sought. The association has clubrooms at 1636 Court place in close proximity to the row. The officers are: Homer Elliott, president; J. F. Waldron, first vice-president; Roy O. Yockey, second vice-president; Guy M. Miller, secretary; E. J. Ward, treasurer. These officers and the following compose the board of directors: Fred Platt, Ira Beddo, Arthur Johnson, J. M. McDonald and Lou Sanford.

Quaker Contest Committee—The following contest committee has been named by President L. D. Berger, of the Quaker City Motor Club, to take charge of the various events to be promoted during 1909: Ferd M. Johnson, chairman; Fred C. Dunlap, R. E. Ross, G. Hilton Gantert, William J. Donnelly, W. West Randall and F. K. Worley, with two additional members yet to be selected.

Motor to Family Reunion—Recently a family reunion of the Halsteds was held at Spirit Wood, N. D., and some of the members of the family motored to the rendezvous. Among the machines were four Holsmans, which were among the first turned out by the company 6 or 7 years ago and which still are giving good service. The Halsteds came distances varying from 20 to 100 miles.

Boston Motor Club Formed—After all conferences toward an amalgamation with the Bay State A. A. failed, the Boston Motor Club finally took shape last week, when about 100 of the members met and selected officers. A special committee was appointed to secure a charter and another to look for quarters. Temporary officers and incorporators were appointed as follows: E. A. Gilmore, president; J. B. Sullivan, Jr., vice-president; E. P. Webber, secretary; A. B. Henley, treasurer; Major H. G. Kemp, H. H. Love, A. E. Adams, A. P. Teele, Kenneth Skinner and R. R. Ross, directors. The following-named were nominated for permanent officers, the election to take place at the next monthly meeting: President, Major J. G. Kemp; vice-president, E. A. Gilmore; secretary,

CADILLAC AND MAXWELL WHICH PLAYED PROMINENT PARTS IN STUNTS FOLLOWING CLEVELAND SHOW

A. D. Peck; treasurer, W. H. Farrington; directors, A. P. Teele, J. B. Sullivan, Jr., Lee Hall, A. E. Adams, W. A. Thibodeau, A. B. Henley, H. H. Love, F. E. Tucker, W. E. Dunbar, H. H. Ross; membership committee, L. R. Speare, A. P. Teele, Fred Ayres, W. A. Schaefer and George Priest.

Newcastle Enterprise—The little city of Newcastle, Ind., which incidentally is the home of one of the largest motor car factories in the country, is arranging for a show of motor cars, draft horses, light harness horses and farm horses on April 1, rather an unusual combination. The city council has granted the use of downtown streets for the show and prizes will be awarded for different classes of cars and horses.

Midwinter Tour to Savannah—C. A. and W. A. Warre and Dr. E. D. Loughran, of Kingston, N. Y., have just completed a midwinter tour from New York city to Savannah in a model K, 45-horsepower Stoddard-Dayton roadster, the route followed taking them through Philadelphia, Reading, Harrisburg, Dillsburg, Gettysburg, Winchester, Natural Bridge, Roanoke, Lynchburg, Danville, Charlotte, Columbia, N. C., Augusta, Ga., to Savannah. It was a case of rain or snow from New York to Lynchburg, while after leaving Harrisburg the tourists struck red clay mud from 6 to 12 inches deep, the rear axle often scraping the mud, making 3 to 5 miles an hour good going. From Lexington to Natural Bridge it was a succession of hills, which made low gear work a necessity.

New York Carnival Plans—Carnival week in New York city, April 5-10, will start with the Fort George hill-climb on Monday, which will be in charge of a committee of which K. C. Pardee is chairman. On Tuesday there will be special straightaway races and speed trials either on the ocean parkway or the motor parkway, C. R. Teaboldt being chairman of this committee. On Wednesday it will be souvenir day along the row, each agent giving away some token. In the evening the trade banquet will be held. Orrel Parker is arranging some special events for Thursday, either at Morris Park or some other suitable place, while Friday, which is Good Friday, will be observed as a day of rest. The big parade will be on Saturday, preferably in the afternoon. John Cutting is chairman of the parade committee and George Moore Smith will act as grand marshal. That evening there will be a public presentation of the prizes won during the week.

STODDARD THAT MADE MID-WINTER TRIP FROM NEW YORK TO SAVANNAH

Mud Larks to Organize—An organization to be known as the Mud Larks is to be regularly formed within the coming year. Every member will have to prove he was a participant in the run to Pittsburg in 1903. The men who took part in that great struggle are asked to communicate with F. Ed. Spooner, 1931 Broadway, New York.

Hagerstown Selected—At the annual meeting of the Norristown Automobile Club, last Friday night, the contest committee reported that it had finally selected Hagerstown, Md., as the overnight stop for its 2-day endurance run, May 18 and 19 next. A trio of pathfinding cars will go over the route as soon as the weather settles, to make the necessary arrangements as to tolls and tags, the latter arrangement being requisite to avoid trouble with the Maryland authorities. The annual election resulted in the choice of the following officials: John H. Rex, president; Isaac A. Smith, vice-president; L. E. Taubel, treasurer; William B. Hart, secretary. For the board of directors, Lewis E. Taubel, Harry A. Wilson and William B. Hart were chosen to serve 3 years; Samuel Roberts, John E. Mountain and Frederick M. Jaquith, 2 years, and Robert A. Jackson, A. H. Roop and H. C. Carney, 1 year.

Jackson-Cadillac Race Off—Owing to pressure that was brought to bear due to the prospective legislation which the Pittsburg motorists propose to push through, the Cadillac-Jackson match race from Pittsburg to Philadelphia was called off. The Pittsburg Automobile Club asked the proposed contestants to call off the contest.

Taxicab Statistics—In Reading, Pa., where Franklin motor cabs were recently installed for general service, figures show that up to date the average passenger haul has been two and one-half passengers per trip. In 12 hours as many as 202 people have been carried in five cabs. With the streets clear of snow an average of something better than 10 miles per gallon of gasoline will be made. In the 2 months since the installation of the five cabs all but one have been in continuous service; that one lost an hour and a half.

ELEVEN CARLOADS OF MITCHELLS SHIPPED TO COIT AUTOMOBILE CO., OF OMAHA

ANALYZING MOTOR CARS' STEERING SYSTEM

EDITOR'S NOTE—This is part 1 of a series of articles by Thomas J. Fay, dealing with the problem of the steering system in motor cars.

RAILWAY equipment does not have to be provided with steering gear, for the reason that the wheels are flanged in such a way that they will not run off of the steel rails over which they are designed to roll. Horse-drawn vehicles are not provided with steering gear in view of the manner in which the horses draw the vehicles along, thus making it necessary to guide the horses instead of the vehicles. In motor cars, however, the principle is different; they are propelled not drawn, nor do they roll over guiding rails; hence they have to be steered.

According to Newton's "first law of motion," even motor cars would not have to be steered on a hard, level roadway, were the motor cars of a harmonious design, and provided they were always to travel in a straight line, for the law says: "If a body be at rest, it will remain at rest; or, if in motion, it will move uniformly in a straight line till acted on by some force."

But, one of the advantages of the motor car is that due to its mobility in all directions despite the law, which urges it forward in a straight line. On the other hand, the ability to direct a car out of a straight line does not defeat the tendency of the same to hold to a tangent, and it is for this reason that it is dangerous to overstep the bounds beyond the ability of the devices available to control.

Stable conditions are present in a car when it is traveling in a straight line. Instability begins with the first turn of the steering wheel and increases as the angle of the road wheels is increased, which instability is also augmented as the speed is increased. That some cars will perform better than others in this respect is assured, if only, it is true, that all cars are not of equal harmony from the point of view of machine design as it relates to the property which can be designated as stable equilibrium.

The first serious sign of instability, when a car is diverted out of its habitual straight course, is when the skidding tendency is noticeable. Fig. 3 depicts the situation under good average conditions, in that it shows the relation between speed of the car, in any given case, in miles per hour, and the radius of the arc of a circle through which it can be directed, within which skidding will not take place on a hard, level road, in the absence of accidental outside influences.

In the curve, Fig. 3 abcissa represent speed in miles per hour, and the ordinates are given values in feet, representing radius of turning, under conditions of eminent instability, as indicated by skidding. If a car is traveling at 40 miles per hour, the curve shows that the intersection with the ordinate representing the skidding radius will be at 150. In a word, then, if a car is traveling at a speed of 40 miles per hour, skidding will ensue if the radius of turning is on a basis of 150 feet.

In actual practice, considering streets of the average width, Fig. 1 shows the usual performance, in turning corners, and the radius of the arc of the circle is given as 75 feet. In this case the curve, Fig. 3, indicates that skidding will take place at about 38 miles per hour of the car. The manner in which the corner is turned, as shown in Fig. 1, is not looked upon as good practice by many motorists, and Fig. 2 is offered to illustrate the proper way to go around corners, according to some authorities. In this case the motorist is supposed to keep to the right, and in so doing the radius of the arc described in turning will be about one-half of that which will be due to cutting the incurb, as represented in Fig. 1.

Going Around Corners

To go around corners in the manner as shown in Fig. 2, it is necessary to slow down, for the reason that the radius of turning will be less, and, as the curve Fig. 3 tells, skidding will follow if the speed is 18 miles per hour, assuming the radius is 37½ feet. Likewise, for every speed of any motor car there is a maximum at which the turn can be made without skidding, and safety demands that skidding be avoided. Skill in driving consists in knowing and maintaining safe speed, taking into account the fundamental laws and their effects, and the road condition, which introduces "accidental" variations, tending to distort normal performance.

Makers of motor cars, if they have in mind the best results, take into account the manner in which turns have to be made in order to avoid skidding on the one hand, and undue tire depreciation on the other. This is not to say that makers of cars can do anything about the skidding question if the speed is higher than the law allows for a given radius of curvature, in view of the effect of centrifugal force, as previously stated. What the makers can do is to avoid certain tendencies, within limits.

Ackerman, in the eighteenth century, discovered that a vehicle, on a curve, to perform properly, had to be provided with such tie rods for the front wheels as would enable them, respectively, to roll on independent orbits, not to a common radius, but from a common axis. Fig. 4 is offered to illustrate the point to be made, in

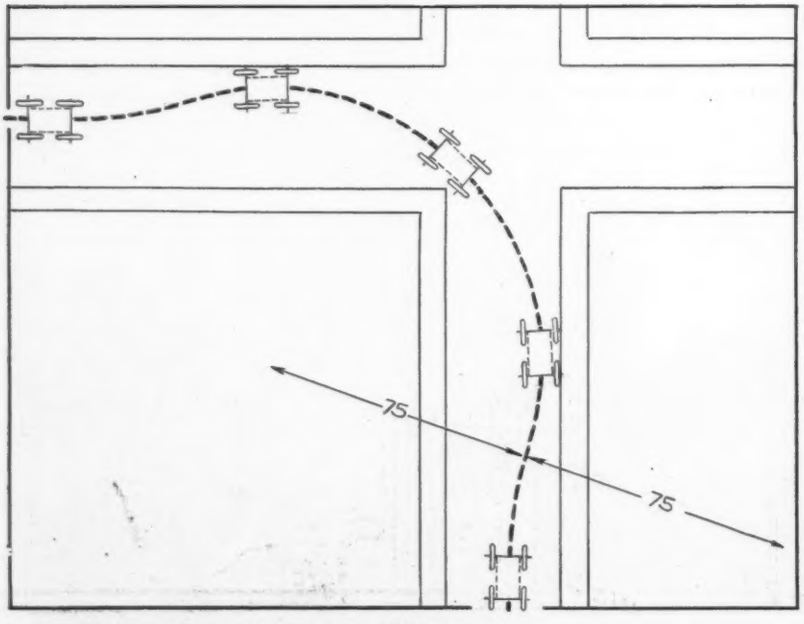


FIG. 1—ORDINARY METHOD OF TURNING A CORNER

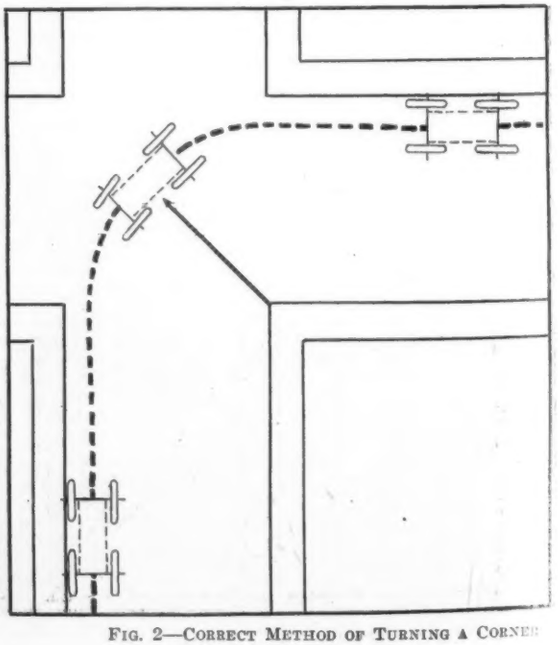


FIG. 2—CORRECT METHOD OF TURNING A CORNER

which it is shown that true rolling motion of all the wheels will be realized when the car is going straight ahead. When the wheels are canted, as in negotiating a curve, if the tie rod arms are parallel, since they are connected by a rigid tie rod in practice, the radius O A will be the inner wheel radius C. D, of turning, but the outer wheel will cant to the same angle, and the arc S S′ will be described, which arc is not parallel to the arc C C′, and the wheels will not roll perfectly; in fact, the outer wheel will drag.

But if the tie rod arms are to the rear of the axle and converging, in the manner as will be presently shown, it is then that the two front wheels will roll on parallel orbits to a common center, O, Fig. 4, and the inner wheel will have a radius O A, while the outer wheel will have a radius of turning O. B. As the figure shows, the arc R R′ is parallel to the arc of the circle C C′, under which conditions the wheels will perform their functions without dragging, and the tires will avoid damage in the process, because parallelism will be maintained.

The Ackerman-Jeantaud system of steering, a definite advance over the original idea of Ackerman, is illustrated in Fig. 5, in which the arms O L and O′ L of the tierod L L converge to the rear, and are parallel to, and cut by, the line A L O on the right side, and A L O′ on the left side. The point A is at the center of the rear axle. In turning, the point A moves out on the rear axle plane to the point A′, with the result that the turning radius of the car becomes that of the radius A′ O′ for the inner wheel, and the radius of turning of the outer wheel becomes A′ O, so that the two canting wheels turn on parallel orbits around a common axis, A′. Obviously, the arms L O and L O′, instead of converging to the rear, would serve just as well if they were made to diverge to the front, provided only they be designed to remain in the same plane as a projection of the line A O for L O and A O′ for L O′. This is not always possible in practice, because the spokes of the road wheels are in the way.

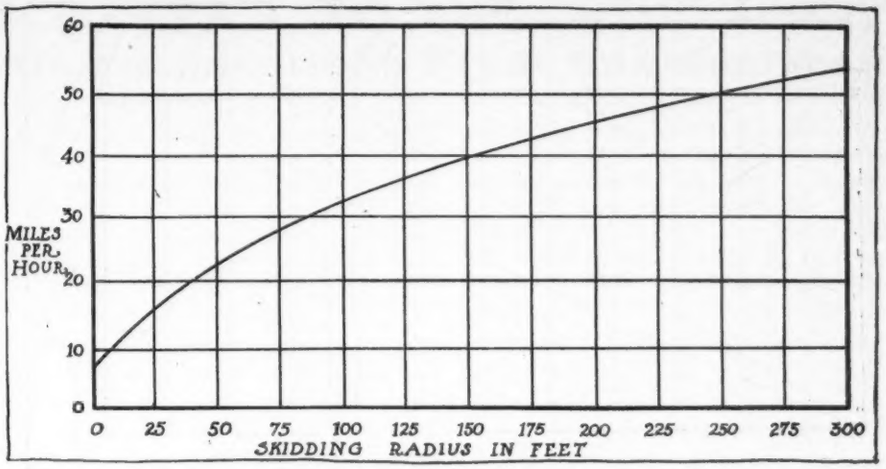


FIG. 3—CHART SHOWING RELATION OF SPEED TO SKIDDING RADIUS

Illustration of Common Practice

Practice leaves its earmarks on everything, and the Ackerman-Jeantaud system of steering gear is no exception to the rule. In some shops the manner in which the problem is dealt with is illustrated in Fig. 6; one of the advantages is due to greater accuracy in the cases involving a turning radius of more than that due to 30 degrees cant of the steering road wheels.

Considering the diagram, Fig. 6, it is first necessary to decide upon the governing conditions in practice. If it is true that the average turning radius is, say, 75 feet, as given in Fig. 1, this is the distance to use in the diagram Fig. 6 as the value of O A. The distance b equals the wheelbase of the car, and a is equal to the distance between the two pivots of the right and left steering knuckles. Thus far it has not been necessary to do any figuring, and all that remains is to fix upon the angles m and n.

It will be remembered that the radius, 75 feet, is not the turning angle of least radius; it is the most likely radius, all things considered. Under the circumstances, to be able to establish the relative angles, m and n, it is to proceed as follows:

$$1\text{—}\cot m = \frac{AC}{CO};$$

$$2\text{—}\cot n = \frac{BC}{CO};$$

$$3\text{—}\cot n - \cot m \frac{a}{b} = \frac{BC - AC}{CO};$$

$$4\text{—}\cot n = \cot m + \frac{n}{b}.$$

While it is always desirable to know the method by which results are arrived at, it is important to see things as in a bird's-eye view, in order to realize something of the relative advantages. Then, it is to avoid mistakes if tabulations are

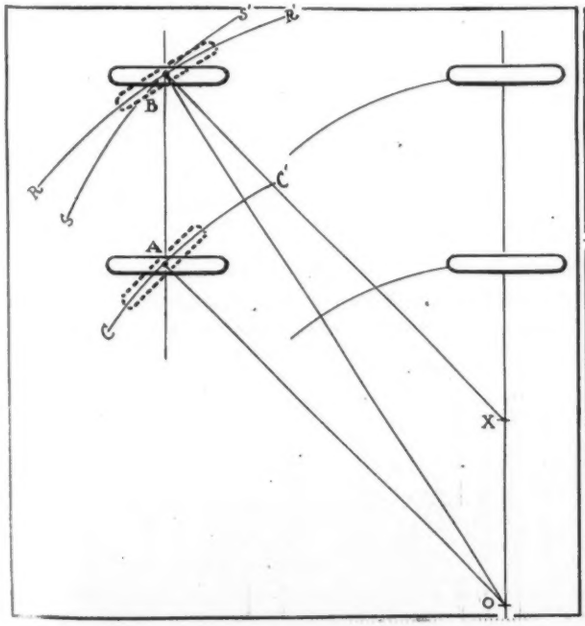


FIG. 4—WHY WHEELS DRAG ON A CORNER

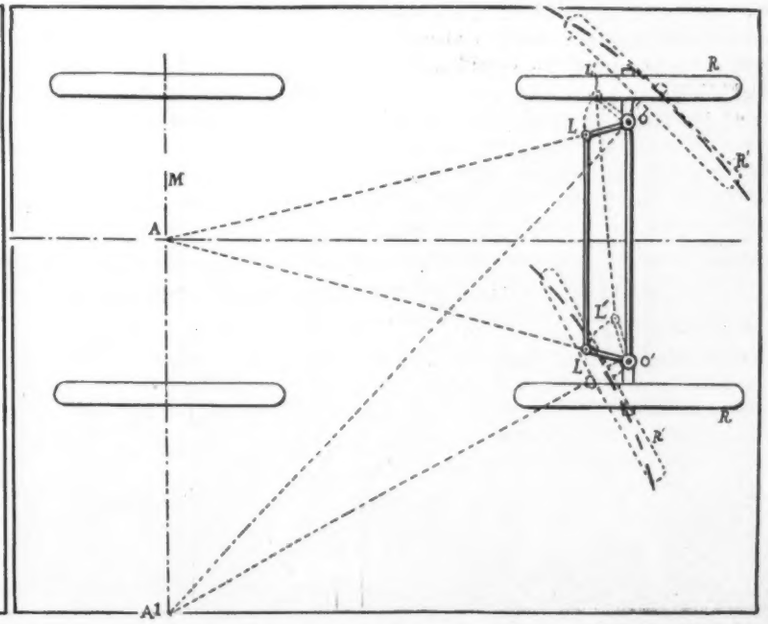


FIG. 5—CHARACTERISTICS OF ACKERMAN-JEANTAUD STEERING SYSTEM

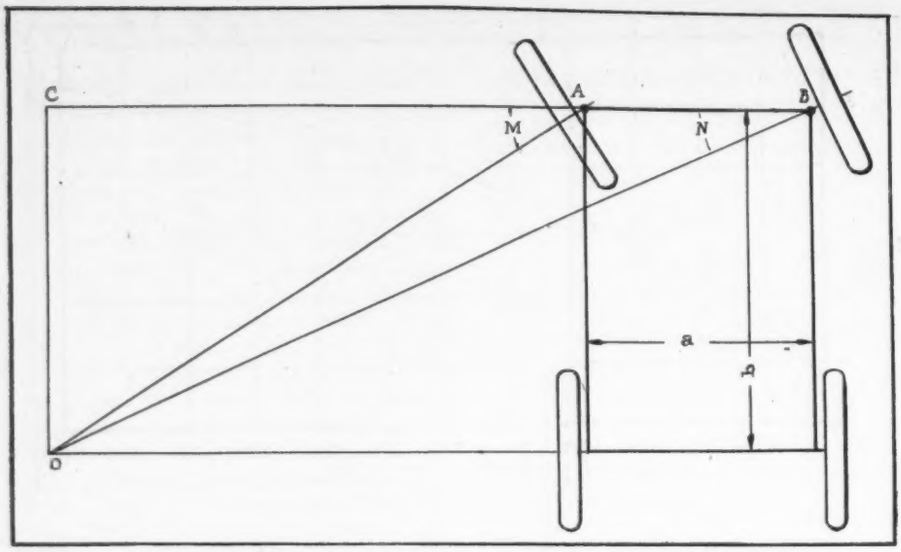


FIG. 6—HOW TO LAY OUT STEERING LINKAGES AND PARTS

made, since they can be done on a leisure basis and mistakes can be discovered and corrected. With these advantages in the mind's eye, the tabulation herewith offered takes into account the several likely canting angles of the steering road wheels of motor cars, and the effect of the length of wheelbase may be seen at a glance.

As an illustration of the use of the accompanying table, it will be enough to call attention to a car with a 100-inch wheelbase, which shows beneath a 15-foot turning radius if the wheels are canted 45 degrees from the center. In like manner it will be possible to fix upon the turning radius, in feet, for all cars up to 116 inclusive wheelbase for all canting angles between 34 and 46 degrees from the center.

Equalization of Power

While it is true that the question of steering is ordinarily regarded as a simple operation, in which guiding the car is the main feature, it is nevertheless useless to go through the process unless the car will mind the helm, so to speak. As a matter of fact, the steering wheel is almost the least device to be given consideration in the process.

The power is delivered to the traction wheels, usually the rear wheels of the car, and since the two traction wheels do not always travel at the same speed, some means must be provided by which the power can be equalized. If the power is not equalized, it is then that skidding will be likely, since the ability of each of the wheels is limited, and each must be forced to do its share of the work.

But the share of work that must fall to each traction wheel is a variable depending upon the road conditions, speed of the car, curvature of the road, centrifugal force, and all the other tendencies such as will cause the traction wheels to press more or less. If the load is equal on both wheels, and if the road is of the same texture under them respectively, then, if the car is on the "straight ahead," it is a fair inference that the power requirement will be the same for both of the traction wheels.

Unfortunately, there are the conditions under which the steering wheel will be the least needed; the car should tend to maintain its straight course, as previously stated, and it follows that when the steering gear is used the conditions of its use are quite different.

In order to be able to deliver the power in proportion to the respective abilities of the two traction wheels, it is the custom to use compensation gearsets—differential gears—which may be of divers designs, as square-cut or bevel types of gears. At all events, the purpose of the differential is to correct the evil tendencies, and, in a large measure at any rate, the use of the differential results in the equalization of the delivery of power to the respective traction wheels, thus aiding in the steering process, since skidding is aborted.

Action of Differential

The complex nature of the differential, and the curiosity it arouses in the haunts of owners of motor cars, demands an explanation of its peculiar action, at this time, on the ground that it is of great importance in connection with the steering operation, since it assures that a car will respond to the will of the operator as expressed by the steering wheel. Fig. 7 shows the arrangement of a bevel type of differential gear, in which A represents the bevel pinion which, in conjunction with its mate B, transmits the power of the motor to the differential housing C. Tracing the transmission further in its migration, it is to note that the spider D D serves as the means and the axis of rotation of the "satellites" E and E′, through which the distribution is made to the planet F and F′, which, in turn, are keyed to the differential shafts G and G′, which shafts are in rigid relation to the traction road wheels.

The one remaining question is, How does the differential perform the distribution in delivering power to the respective traction wheels in proportion to their respective needs? Considering the source of torque to be the motor, which causes rotation of the pinion A, it is self-evident that this pinion, since it meshes with the gearwheel B, will compel rotation, and the direction will be in the usual direction, thus assuring that the housing of the differential gears will rotate in response to the motor, and to this extent there is no differential action whatsoever.

Since the satellites E and E′ are free to rotate on the spindles of the spider D D, and considering that the spider D D is free to rotate on the bearing over the shafts G G′, the satellites are free to respond to the tendencies in the manner as follows: When the car is on a straightaway, the satellites merely serve as a balancing arm, weighing out to the planets F and F′, equal increments of torque, and both road wheels rotate at a common speed, during which period the satellite pinions do not rotate, with their spider, around G G′, nor will the same satellite

CANTING ANGLES OF STEERING ROAD WHEELS AND LENGTH OF WHEELBASE PERMISSIBLE

Angle of inner wheel, degree	Length of wheelbase in inches and turning radius in feet												
	92	94	96	98	100	102	104	106	108	110	112	114	116
35	17	17	18	18	18	18.5	19	19	19	20	20	20	20
36	17	17	17.5	18	18	18	18.5	19	19	19	19	19	20
37	16.5	17	17	17	17.5	18	18	18	18.5	19	19	19.5	20
38	16	16.5	17	17	17	17.5	18	18	18	18.5	19	19	19
39	16	16	16	16.5	16.5	17	17	17	18	18	18.5	19	19
40	15	16	16	16	16.5	16.5	17	17	17.5	18	18	18	18
41	15	15.5	16	16	16.5	16.5	17	17	17	17.5	18	18	18
42	15	15	15.5	16	16	16	16.5	16.5	17	17	17.5	18	18
43	15	15	15.5	15.5	16	16	16	16.5	16.5	17	17	17	18
44	15	15	15	15	15.5	16	16	16	16	16.5	17	17	17
45	14.3	14.5	15	15	15	15.5	16	16	16	16	16.5	17	17

Note—The distance in feet in the body of the table are given in the nearest—above—feet, and fractions of feet, on the ground that further accuracy would be uncalled for.

pinions E E′ rotate on their own bearings on the spindles of the spider D D. The whole housing rotates instead. But if the car is negotiating a curve, it is then that the differential will have a function to perform, since the road wheel, on the inside, will make a less number of revolutions than the remaining road wheel. The result is that the speeds of the planets F and F″ will not be the same, and during this time compensation will be due to rotation of the satellite pinions E and E′, not only on the spider spindles D D, but the spider will also rotate on the shafts G and G′. During the period of this relative motion the ability to deliver power is in no way interfered with, and while the road wheels are enabled to revolve at different speeds, they are also driven, respectively, without cessation of torque, although it is true that the wheel traveling the fastest will measure the greatest result in horsepower.

What happens under other conditions, as on bad roads, is a matter which will not be taken up here, nor will certain other possibilities of the differential gear be interjected, on the ground that the situation would be unduly complicated. The point to be made here is that it is the action of the differential gear which enables cars to roll around curves, delivering power to both wheels without altering the "slip" relation, and rendering stering a safe enterprise as well.

ROOKLIDGE WANTS RECEIVER

Kansas City, Mo., March 9—A receiver for the Missouri Valley Auto Co., 1112-14 East Fifteenth street, is sought in a suit filed today in the circuit court by Harvey E. Rooklidge, who has been president of the company. The suit is directed also against the following, as stockholders: Winfield Denton, Forrester C. Caldwell, Charles W. German and Dana B. Ward. Mr. Rooklidge says he bought a one-third interest in November, 1907, and, on the thirtieth day of the same month was elected president. On February 26 of this year, says the petition, the defendants took forcible possession of the garage and thereafter refused to recognize Rooklidge as president. In addition to asking for a receiver, Mr. Rooklidge asks that the affairs of the concern be wound up. He says there are debts to the amount of $30,000. He says he was told, when he bought in, that the $15,000 capital was fully paid up, but he asserts now that he found matters to be different, after he had made an investigation. The Missouri Valley company is agent for the White, Reo and Premier.

Communications From Manufacturers

NEW YORK—Editor Motor Age—On Thursday, February 18, 1909, the Royal Automobile Club of England held tests to ascertain the actual properties of the Kempshall tire in prevention of skidding, and we enclose extract from the London Daily Telegraph, February 20, 1909, showing the results of the tests:

On Thursday the Royal Automobile Club held a trial for the purpose of issuing certificates of performance of the Kempshall tire, and the Allen-Liversidge front wheel brake, as regards skidding on a greasy road surface. The venue of this test was at London General Omnibus Co.'s depot to its motor omnibuses at Dolls-Hill, Cricklewood, which has an excellent granite-set paved yard of considerable area. This yard has a central gulley running through it, so this gives a camber on one side, according to how the vehicle is driven either to the right or to the left of it. An area of 60 feet long by about 20 feet wide was covered to a depth of 3 inches with a mixture of Thames mud and soft soap. This produced an abnormally slippery surface on the granite sets, worse than is likely to be found on the road. The first vehicle to be tested by the Royal Automobile Club judges was a 15-horsepower Charron landaulet fitted with Kempshall tires on its four wheels. This was driven at about 15 miles per hour, and did not skid in the slightest degree passing over the prepared surface. Again this car was driven at about the same speed, and the brakes suddenly put on, but the back wheels were not quite locked. The car behaved admirably and gave no side skid whatever. When the back wheels were locked on the car entering the 60 feet of mud and grease it deviated about 2 feet in the last 10 feet of the mud, but in a very slight curve. An ordinary Renault taxicab, fitted with a new type of Kempshall tire, was the next vehicle tested. This gave splendid results also, and, with locked wheels traveling 15 miles an hour, over the slippery surface, only deviated 7 inches in 50 feet from the actual straight line, and this when driven on the camber of the gulley as the muddied road surface for one wheel. Altogether the Kempshall tires practically demonstrated their non-skidding propensities under most severe conditions, and showed that they acted as non-skids, whether driven on a straight or bending course.

We believe this will be of interest to readers of Motor Age.—Cryder & Co.

WHOSE OIL WAS USED?

New York—Editor Motor Age—An unusual situation has arisen in connection with the light car race at Savannah which we should like to explain. Immediately after that race, acting on information received from the Hol-Tan company, the entrant of the winning Lancia car, we advertised that Panhard oil was used on the winner, and simultaneously with our announcement appeared the announcement of one of our competitors to the same effect. We believe it unjust to your publication, to your readers and especially to ourselves to have these two contradictory statements appear without any explanation. We therefore wish to state the facts and beg of you to draw your own conclusions, bearing in mind the methods which have been employed by some manufacturers to get their products used on racing cars, and that we have never made any special effort to do this, the present case arising merely as the result of a regular annual contract. The firm of George A. Haws, manufacturing Panhard oil, had, and still has, a contract with the Hol-Tan company calling for the exclusive use of Panhard oil by them. We have proof that a supply of Panhard oil was shipped by the Hol-Tan company to Savannah for the race and arrived in time for it. The president of the company and also the Lancia mechanic assure us that Panhard cans were carried and used on the car during the race, the tops having been cut out to make pouring easy, so that if any other brand were used it was done by emptying our cans and refilling them. The driver of the car, with whom our competitor claims to have had an understanding, has stated in writing that he does not know what oil was used and the Hol-Tan company absolutely denies having dealt with anyone but us. We have reason to believe that our competitor has had similar misunderstandings with other oil houses and are naturally anxious to have the public set right in this instance at least, thus releasing ourselves from a rather ridiculous position. We certainly would not consider for a moment making a claim to which we did not believe ourselves justly entitled.—George A. Haws.

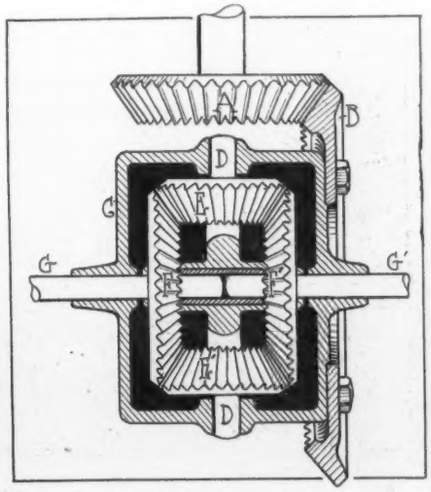


FIG. 7—THE DIFFERENTIAL

MARION NOT DISCONTINUED

Indianapolis, Ind.—Editor Motor Age—About 5 months ago there was a report circulated that the Overland company had bought the Marion plant and that the Marion company was discontinuing building Marion cars. This report had no foundation whatsoever, and is still being talked by some of our competitors. We wish to put the general public right on the matter. The Marion Motor Car Co. will build 400 four-cylinder 35-horsepower cars in three style models—five-passenger touring cars, toy tonneau and roadsters. The Marion Motor Car Sales Co., Indianapolis, Ind., is the general sales agent for the company.—Marion Motor Car Co.

Motor Car Development

THE Mississippi valley gives promise of being a considerable factor in motor car manufacture of the next 3 or 4 years. At present, and for several years back, four centers have taken up this phase of manufacturing. Starting from the south, St. Louis has been identified with the interests from the start. A little further north the group of three cities, Moline, Rock Island and Davenport, has been prominent, and today has four or five concerns building cars. Further north Dubuque has been on the manufacturing map for years; at the north, the Twin cities of Minneapolis and St. Paul, while great motoring centers, and points where motoring enthusiasm runs high, have not been extensive manufacturers, only one or two concerns of largely local nature representing these cities.

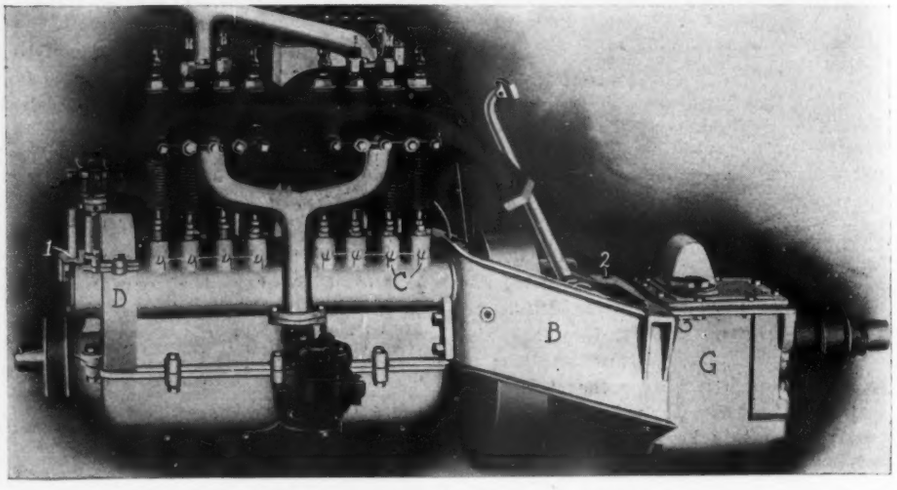


FIG. 1—VALVE SIDE MOLINE SMALL MOTOR

The energies of the Moline Automobile Co., East Moline, Ill., for this year are devoted exclusively to two types—a 25-30-horsepower model M five-passenger car, and 35-40-horsepower model K five-passenger car with tonneau accommodations for two extra seats. In order to meet the varied needs of a car in the central and western states, the small size is made with either shaft or chain-drive. It is regularly listed as a chain-driven car, and built with a 14-inch clearance. When chain-drive is used, a straight tubular front axle is employed, whereas with shaft-drive a dropped I-beam axle is fitted.

Both of these Moline models have many lines of similarity, agreeing in the use of four-cylinder motors with L cylinders cast in pairs, three-point suspension, unit motor and gearbox construction, leather-faced cone clutches, selective gearsets, and scroll elliptic rear springs. Although the general necessaries are alike in both, there is a variety of difference in the two models.

Evolutions of 1908 Models

The company manufactured two models last year, and both of this season's types are but evolutions of the 1908 ones. The big car has not been altered much, but the small one has been given a particularly good brushing up, upward of a dozen alterations of importance having been made. This small car has 3⅞ by 4½-inch cylinders, which gives a formula rating of 24. Like the big car, the motor and gearbox are a unit, supported by three-point suspension, one at the front on a cross-piece of the frame and two at the rear immediately in front of the gearset, the suspension at this point being beneath a channel cross member, the three bolts supporting the plant being designated respectively 1, 2 and 3 in Fig. 1. In the big motor, Fig. 4, two of the points of the support are in front and one at the rear, each forward support being an integral motor arm and the rear support a bed plate upon which the transmission rests. One important difference between the unit plants of the two models is that in the small car a hollow rectangular box-piece B is interposed between the crankcase and gearbox, bolting to the opposing ends and within which casting there is accommodation for the flywheel and cone clutch. This box compartment slants rearward, thereby lowering the location of the gearbox, so that mainshaft of the gearset is on top; whereas, in the big car the mainshaft is on the bottom. Still another difference exists: In the big motor formed integrally with the crankcase are two arms A, which spread, leaving room for the flywheel with cone clutch between them. Other pieces A1 bolt to the rear of these, and between these at their rear end the gearbox G is clamped, being bolted to each. The selective gearsets are of the same design, offering three forward variations and having the main and countershaft in the same vertical plane, but the small car uses a smaller set, and has the shifting mechanism on the top of the case, a small inverted V box enclosing it.

Water Pump Eliminated

One of the innovations in the small motor is the elimination of the water pump, and the employment of thermo-

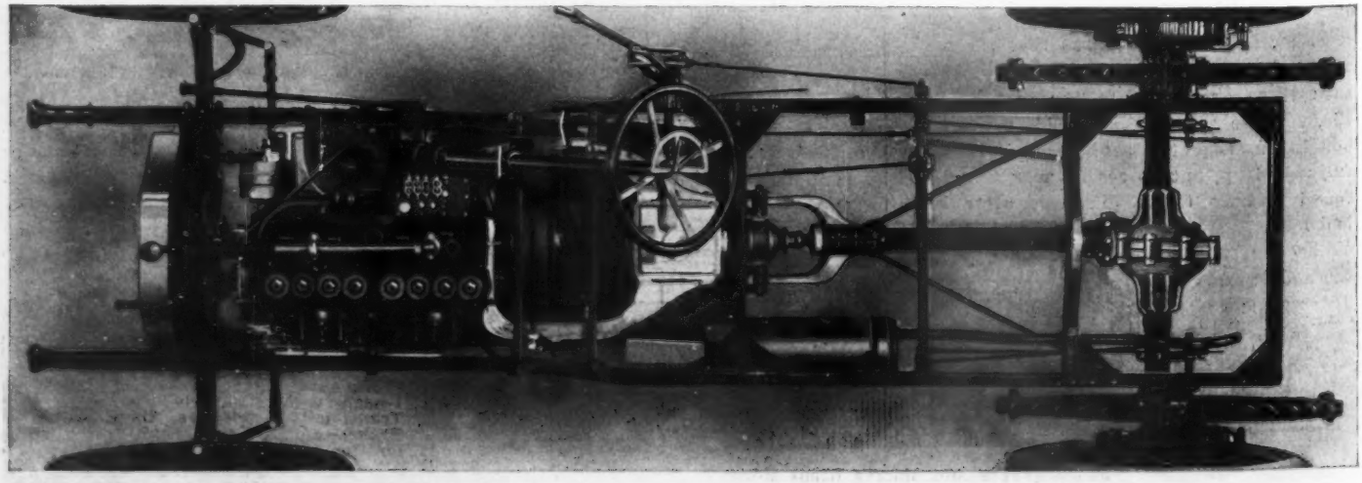


FIG. 3—CHASSIS OF MOLINE LARGE CAR WITH CROSS SHAFT FOR DRIVING PUMP AND MAGNETO

Two Moline Types for 1909

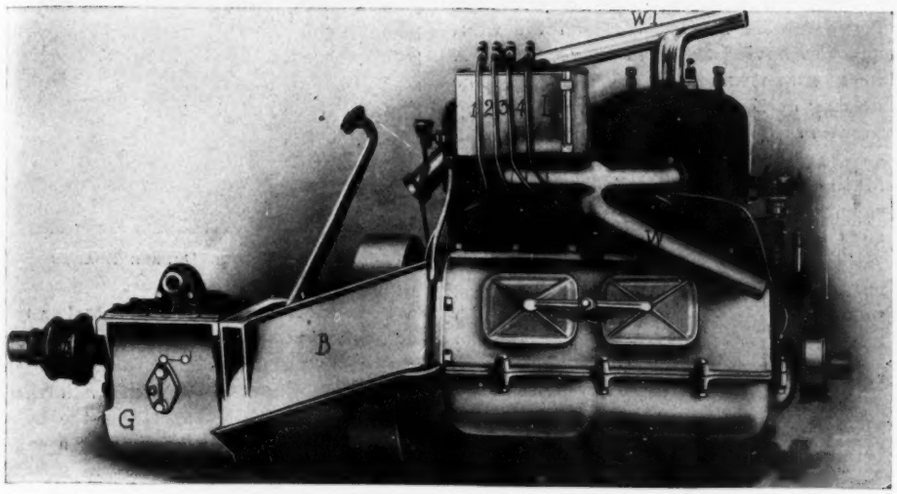


FIG. 2—NON-VALVE SIDE MOLINE SMALL MOTOR

syphon circulation. This is shown in Fig. 2, where the intake pipe W is a T tubing with a stem bent forward in the direction of the radiator base with which it connects by hose. The return water pipe W1 from the jacket heads is of slightly larger diameter than when the pump was used and connects with the tank portion in the top of the radiator. A slightly larger radiator capacity is used and on this motor the fan, which last year was driven by gearing and a friction clutch, is now belt-driven. In Fig. 1, which shows the valve side of the motor, an improvement is noted, in that the valve stem guides C are formed integrally with the crankcase; whereas, last year the four guides for each twin casting were in an integral piece which was bolted to the top of the crankcase. Forming these guides integrally with the cast iron crankcase means the elimination of pieces, which reduces the cost of manufacture in medium-priced cars. In each guide is a set screw to prevent the turning of the valve lifter rod, and so preventing the rollers on the lower ends of them getting out of proper contact with the cams. A still further change noted in this motor is that the compartment D, housing the half-time gears, is formed integrally with the crankcase; whereas last year these gears were placed in a compartment separated and located slightly in advance of the front end of the case. This is another indication of the elimination of parts in the motor. A still further change in this small motor is that the exhaust manifold is now located above the point where the exhaust escapes from the valve ports. This means that the hot exhaust pipe is high and well out of the way, and should the carbureter, which is located on this side, have to be adjusted or repaired, it can be without coming in contact with the hot manifold, which is an important factor in any car.

Small Car Equipment

The small car is regularly listed with storage battery ignition, using a quadruple dash coil and commutator mounted on a short shaft at the forward end of the motor. For an additional consideration a Splitdorf magneto is fitted, this being mounted on the valve side on a bed plate immediately in advance of the carbureter. The magneto is driven by gear directly from the camshaft, this being possible by cutting away the timing gear compartment at D and fitting a detachable cover to enclose the magneto gear. With the magneto attached the timer is removed, but the battery retained as a supplementary system, when the current is passed through the single-unit coil on the dash used in conjunction with the magneto and distributed to the plugs through the magneto distributor.

The lubricating system of this motor is shown on the non-valve side, with a four-feed mechanical oiler L, driven by eccentric through the rod R from the rear end of the camshaft and having four leads, 1, 2, 3, 4, 1 and 4 delivering oil to the end bearings of the crankshaft, and 2 and 3 to the front and rear twin castings. It will be noted from the illustration these leads connect with the twin castings at the angle between the cylinders, so that one lead supplies oil to two cylinders. In some of the motors a fifth lead is added which connects directly with the half-time gears.

Motor in the Big Car

The motor of the big car, Fig. 4, has many points of difference, although its crankcase and cylinder design resembles that of the small car. Most important is the grouping of the water pump W2, and the magneto M on the opposite ends of the transverse shaft at the front of the motor, this shaft being driven by spiral gears. In front of this cross-shaft is the compartment D1 housing the half-time

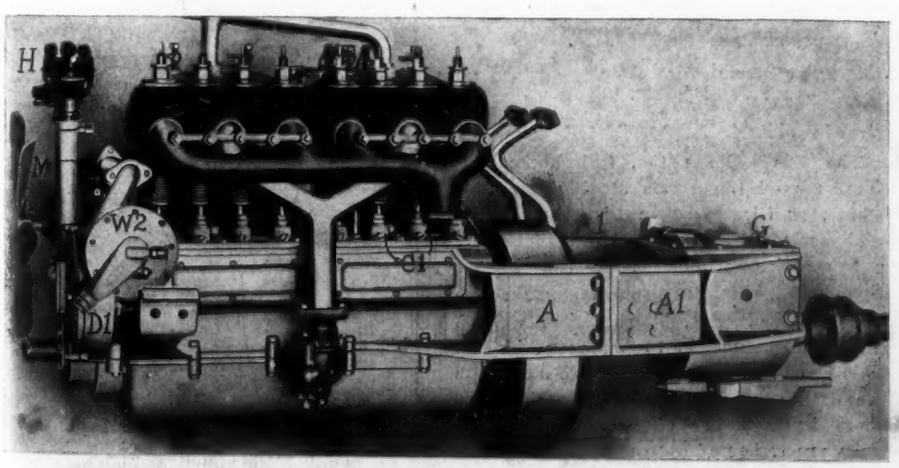


FIG. 4—VALVE SIDE MOLINE LARGE MOTOR

MOLINE SPECIFICATIONS

MOLINE MODEL K

Horsepower—35-40
Cylinder Diameter—4½ Inches
Piston stroke—5 Inches
Wheelbase—116 Inches
Tires—Front, 36 by 3½ Inches
Tires—Rear, 36 by 4 Inches
Front Springs—Semi-elliptic, 40 Inches
Rear springs—Scroll elliptics, 42 Inches
Rear axle—Roller bearing
Front axle—I-beam
Transmission—Selective, three speeds
Brakes—Internal and external rear wheels
Ignition—Double system with Bosch magneto

MOLINE MODEL M

Horsepower—25-30
Cylinder diameter—3⅞ Inches
Piston stroke—4½ Inches
Wheelbase—107 Inches
Tires—Front, 34 by 3½ Inches
Tires—Rear, 34 by 3½ Inches
Front springs—Semi-elliptic
Rear springs—Scroll elliptic
Rear axle—Ball bearing
Front Axle—Tubular with chain drive, I-beam with shaft drive
Transmission—Selective, three speeds
Brakes—Double rear wheels
Ignition—Battery

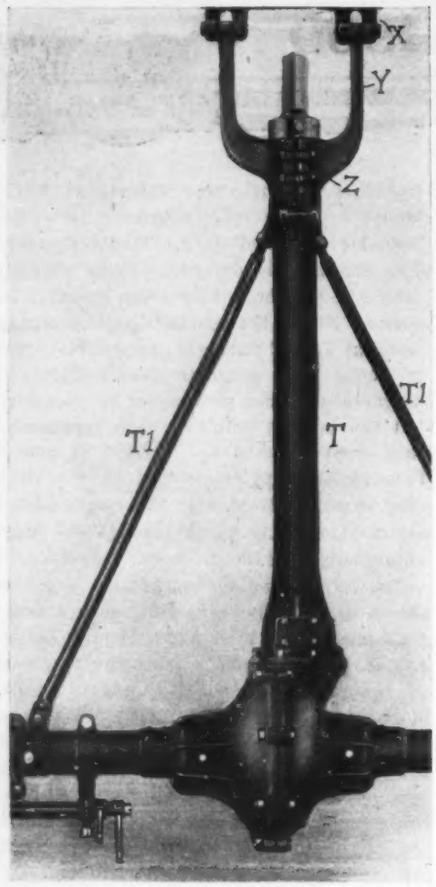


FIG. 5—MOLINE SHAFT-DRIVE SYSTEM

gears, and above it rises the tube supporting the distributor. The exhaust manifold in this car is outside of the intake and considerably lower than in the small car. The valve stem guides C1 are formed in groups of four, for each twin casting.

As already stated, pump water circulation is employed on this car and two systems of ignition entirely independent of each other. The main system is a high-tension Bosch magneto M, the minor system a storage cell, current from which passes through a single-unit coil and is delivered through the distributor H to the plugs. The lubrication on this motor is the same as that on the small one.

The Moline shaft drive is illustrated in Fig. 5, in which the propellershaft is inclosed in a tube T, supported by converging brace rods T1. At the forward end a yoke Y is clamped to the tubing, forming a rotable bearing at Z on the tube, and also having a hinged connection at X to a cross-member of the frame. The bearing at Z allows of one wheel passing over an obstacle without placing any strain on the yoke Y, the tube T simply turning at the point Z in the yoke. The hinged supports X allow of any vertical movement caused by flexion of the springs. The entire propelling force of the car is transmitted from the rear axle through this tube T and the yoke Y to the frame, there being no strut rods from the ends of the axle to the side members of the frame. With this system there is but one universal joint, which is located so that the axis of the joint is in line with the hinge X, the import of this being that the angularity of the joint changes whenever the flexion of the springs supporting the car change, and having the hinges X and the joint with their axis in alignment no strains are set up.

Arrangement of Chain-Drive

When, however, chain-drive is employed on the small car, the arrangement is not illustrated in Fig. 3, the countershaft being supported beneath the crosspiece of the frame and carrying the end sprockets for side chain-drive. Where shaft-drive is used internal and external brakes are used on the rear wheels, there being an air gap between the drum on which the internal brake engages and that on which the external clamps. The object of this is that should the drum of the external become heated through continued use of a brake the internal drum remains cool; whereas, when the two brakes operate, one on the inside and the other on the outside of the same drum, the drum is heated, no matter which set of brakes is used. When chain-drive is employed only one set of rear wheel brakes is employed, it expanding within the rear sprockets. The regular brake in this case is a band operating on the transmissionshaft immediately in front of the jackshaft with a chain-drive car and the propellershaft is not incased and has two universal joints.

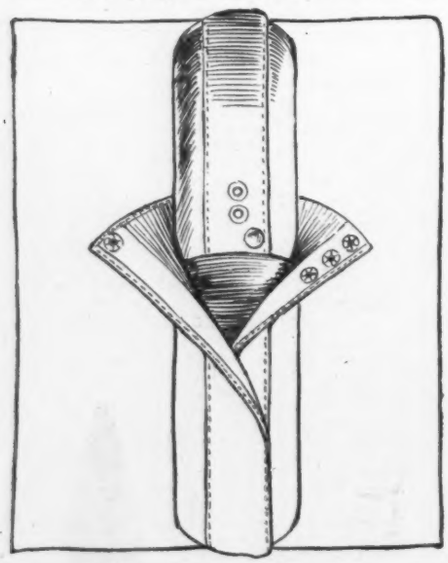


FIG. 7—HOPEWELL TIRE CASE

DAVIS STEEL TIRE ARMOR

The Davis Rope Co., Chicago, manufacturers of the Davis steel tire armor, which, as illustrated in Fig. 12, consists of a series of sections fitted transversely over the tire and hooked into the clincher rim at each side. Each section has a central or tread part, T, furnished with a diagonal corrugation to prevent skidding. This has attached at either side a linkage connecting with the hook, which anchors beneath the clincher rim. These links are either of chrome nickel or drop-forged phosphor bronze. Any number of these sections can be attached to the tire, depending on the extent of the injury to the outer casing, and if necessary the entire tire could be encased with them. This concern also manufactures the Davis anti-skid chain, which consists of a series of these cross sections, spaced at suitable intervals and attached at either end to circular side chains. This side chain has a turnbuckle for adjusting and also a spring at one point for retaining its tension on the tire.

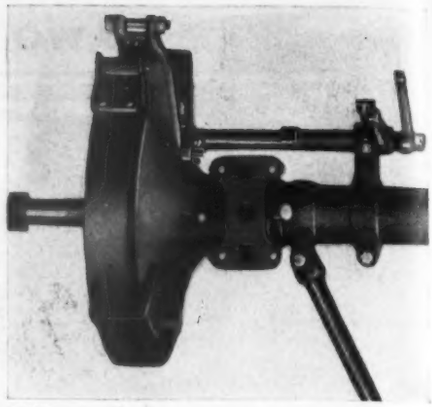


FIG. 6—MOLINE DOUBLE BRAKES

TELESCOPING SCREW JACK

The Joyce-Gridland Co., Dayton, O., has recently marketed a new telescoping screw jack, which, as illustrated in Fig. 8, has two screws—an outer one A and another B working within it. The jack is operated by a ratchet handle H, this handle permitting the jack to be worked in cramped places. The outer screw A operates from the base of the jack, and the providing of an oil bath within this part of the jack insures lack of wear as well as ease of operation.

M. D. C. AIR CRANK

The Churchill-Lee Co., Detroit, Mich., exhibited at the recent Chicago Coliseum show its M. D. C. air crank, illustrated in Fig. 9, which is a compressed air device for starting gasoline engines. The disk

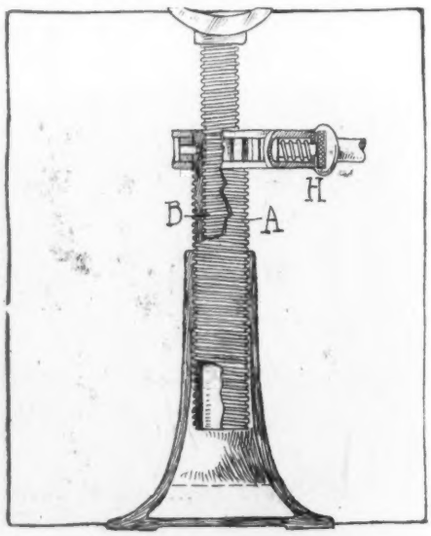


FIG. 8—JOYCE-GRIDLAND SCREW JACK

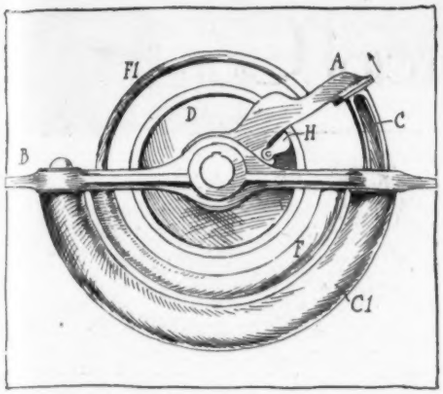


FIG. 9—A NEW SELF-STARTER

D is keyed to the forward end of the crankshaft. Loosely mounted on the hub of the disk is an arm, A, to which is attached a semi-circular connecting rod, C, operating in the cylinder, C1. On the end of the connecting rod C is a leather-faced piston. Air is admitted at the end B of this cylinder, which forces the piston with connecting rod and arm in the direction indicated by the arrow. Immediately this movement commences, a dog, H, anchors the arm A to the rim of the disk D, carrying the disk around with it. The arm A has a movement of 180 degrees, or half a revolution, all of which is imparted to the crankshaft. Immediately the motor is started, the dog H allows the disk D to overrun the speed of the arm A. A return cylinder, F, contains a piston attached to the connecting rod F1, by means of which the arm A with the connecting rod C is forced back to its original position, at which time the connecting rod C is entirely within the cylinder C1. The air pressure for this self-starter can be secured from a pressure tank on the car or from an air bottle used to inflate a tire. This concern also is marketing a new form of water pump, designed on the eccentric type, as illustrated in Fig. 10. It consists of a cylinder, C, within which is eccentrically mounted the rotor D. This rotor carries three fan blades, F, F1 and F2, connected to the rotor by a hub ending anchored within a receptacle. The weight of each fan blade is such that when in the position of blades F1 and F2 they swing from the rotor to the edge of the cylinder, thus forcing ahead of them the entire volume of water contained in the cylinder. The exit and entrance passages are designated A and B. The pump is claimed to operate equally well in either direction.

LOW-PRICED TIRE CASE

A low-priced tire case, illustrated in Fig. 7, now being placed on the market by Hopewell Brothers, Cambridge, Mass., manufacturers of the Hopewell tire case. This concern is now making two types of button tire cases of similar construction, one of drill known as the Kinder case, and one of duck, the Russel case. The former case is an improved type of button case and in construction differs from the ordinary style in that it has a curved tread, which causes the edge of the case to hug the tire, thereby giving a perfect fit. This curved tread construction requires only three buttons to secure the case to the tire; and the circumferential length of the case is such that through an overlap adjustment, it can fit all makes or treads of clincher or quick detachable tires of a size, as well as the corresponding metric sizes.

ATTACHMENTS FOR DRILLS

The Radial Angular Drill Co., New York, is marketing attachments for the regular drill by means of which it is possible to cut square holes instead of the conventional round ones. This is accomplished by a three-cornered bit which is given a motion in addition to its rotary motion on its fixed axis, and which additional movement constitutes the important feature of it. This is accomplished by a special chuck, which can be fitted to any ordinary drill press, lathe or milling machine. One of the parts of this chuck is screwed directly into the spindle of the machine, and another part, driven by it, receives the rotary motion with a certain amount of side play, this side play being limited and guided by the third part of the chuck, which remains

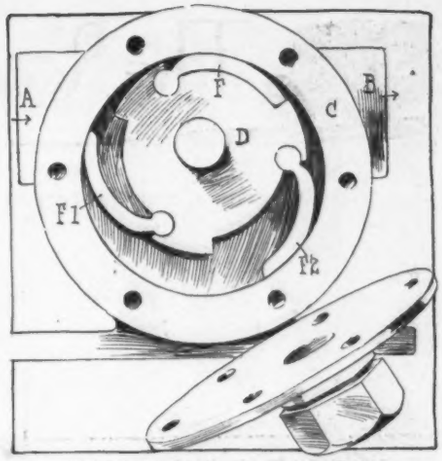


FIG. 10—CHURCHILL WATER PUMP

stationary. The shank of the drill is three-cornered with convex sides and sufficiently large to turn in the square guide of the stationary portion of the chuck. The result is that the three corners of the shank travel around the sides and enter into the corners of the guide; while, at the same time, the three corners of the cutting edges of the tool strike out a square in the work.

AJAX SPARKING BATTERY

The Ajax Battery Co., Chicago, Ill., after a couple of years of experimenting, has produced the Ajax sparking battery intended for ignition and lighting purposes. It is made in three sizes: 4 volts, 40 amperes, 6 volts, 60 amperes, and 6 volts, 80 amperes. One of the points advanced for the battery is the claimed impossibility of the terminals to corrode. The battery is fitted in the conventional cases suitably designed for carrying in compartments on the running board or under the seat of the car.

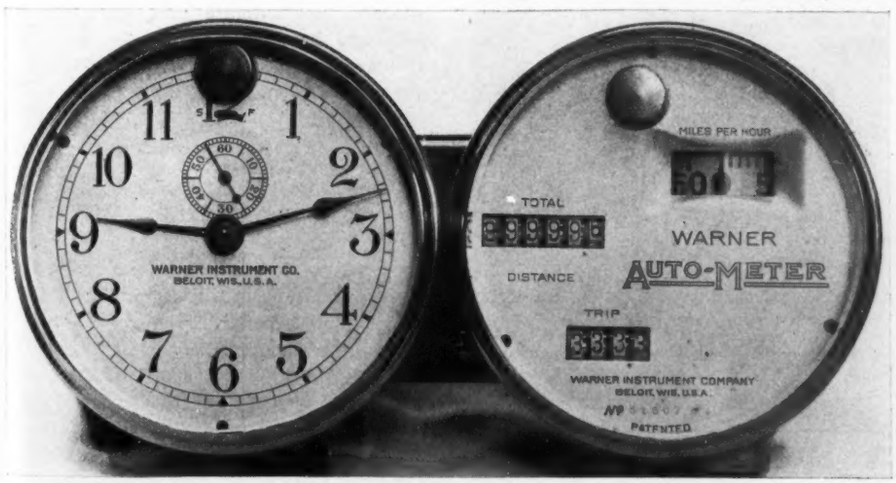


FIG. 11—NEW TYPE WARNER AUTOMETER WITH CLOCK TO SIDE OF INSTRUMENT

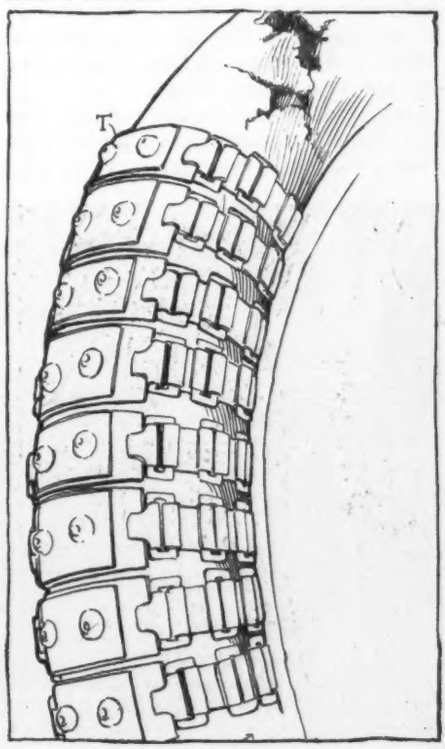
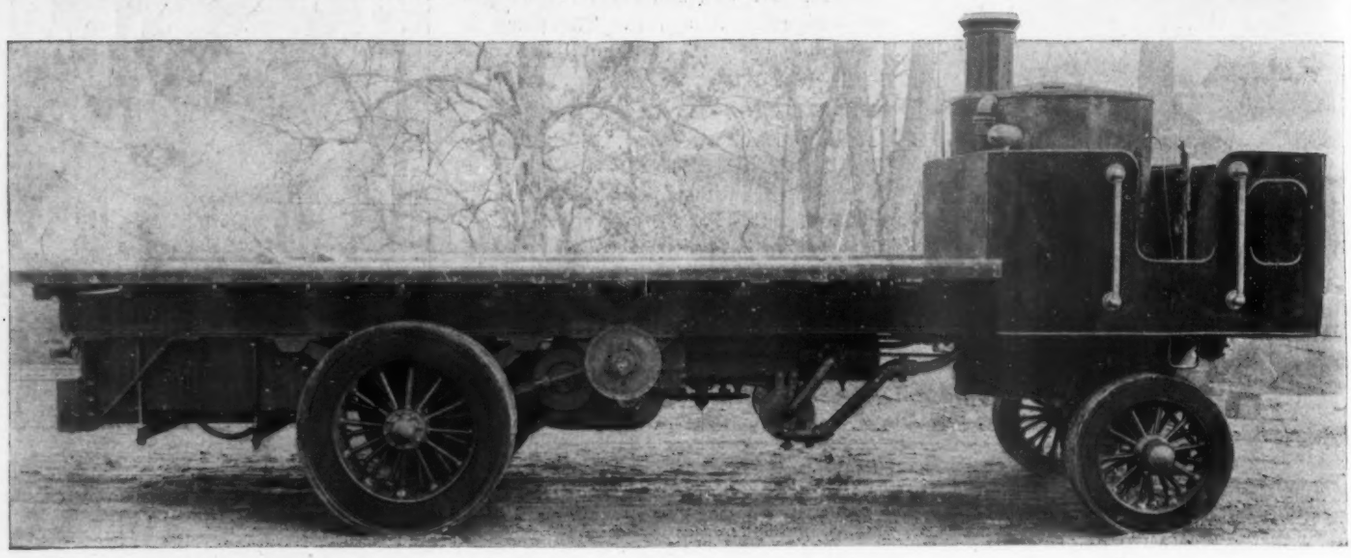


FIG. 12—DAVIS TIRE CHAIN

The Realm of the Commercial Car



MORGAN STEAM TRUCK THAT IS 26 FEET IN LENGTH AND WEIGHS 15 TONS

RALPH L. MORGAN, Worcester, Mass., after 5 years of effort exploiting the truck business, during which time he has experimented comprehensively with gasoline and steam designs, has brought out a 5-ton truck weighing 7,000 pounds, without load. Its power plant is a four-cylinder motor with 5 by 4¾-inch cylinders cast in pairs, and mounted vertically beneath the driver's seat. The transference of power from this motor is through a multiple-disk clutch, two-speed planetary gearset, and side chain drive. The truck is made with a wheelbase of 108 inches; it has a 60-inch tread and has a total loading area of 72 square feet. The motor is equipped with a U & H magneto, Mayer carbureter, and the usual cooling system.

The channel steel frame is 6-inch section for side members, re-enforced with cross pieces and gusset plates. Front axle is a 4-inch I-beam member, the rear axle 3¼-inches nickel steel circular bar. Front and rear springs are semi-elliptic and pressed steel wheels, designed by Mr. Morgan, are employed. The fronts carrying 36 by 5-inch tires, the rear 36 by 4-inch dual sizes. On high gear a 9 to 1 ratio is employed; on low and reserve 27 to 1.

Cost of Motor Truck Service

In the way of proving the superiority and economy of gasoline trucks over other forms of haulage Fred H. Adams recently made a speech before the Bay State A. A., which may be interesting to the prospective purchaser of gasoline trucks.

"During the third week in November the Morgan 5-ton truck in a 'show me' test, hauled in 5 days the enormous load of 333,226 pounds of steel and wire," said Mr. Adams in this speech. "Combining the retail cost of the oil with that of the gasoline consumed in doing this work, the expense totals $3.47. This figures out 2 cents per ton for load carried, or 5 mills per ton mile. This is of course exclusive of driver's wages, etc. The distance traveled by the truck in the haulage was 125 miles, or an average of 25 miles per day. Assuming the 5-ton truck runs 40 miles a day, the following is a generous average of actual cost, all expenses included:

Driver's wages per day	$2.50
Gasoline	.88
Tires	1.60
Depreciation at 20 per cent.	2.33
Interest on investment at 5 per cent.	.56
Insurance at 2 per cent.	.23
Repairs	1.00
Cost per day	$9.35

"Hauling 20 tons per day, the average total cost would amount to, approximately, 4.67 cents per ton mile. On long hauls with full loads this figure would be materially lessened. Compare this with the following approximate cost—data in reloads via horse-drawn vehicles, and the economy of a gasoline truck becomes at once apparent.

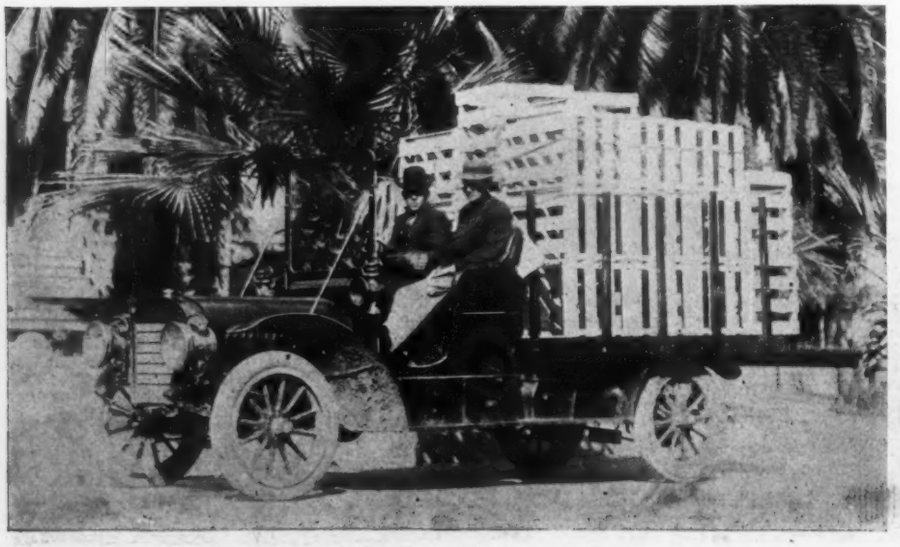
FIRST COST OF 3-TON DRAY

1 3-ton dray	$ 400.00
2 dray horses, at $200 each	500.00
1 set of double harness	100.00
	$1,000.00

WORKING EXPENSE

Interest at 5 per cent.	$ 50.00
Depreciation at 20 per cent.	200.00
Wagon repairs and maintenance	100.00
Stabling, maintaining, shoeing, rent per horse per month, at $30	720.00
Driver's wages, per annum	600.00
Total per annum	$1,670.00

"Two horses harnessed to one truck can haul a net ton load of about 3 tons, at an average speed of 2 miles an hour for 7 hours. Multiply this, 3 × 2 × 7, and you have 42 net ton miles. Multiply 42 by 300 working days and you have 12,600 net ton



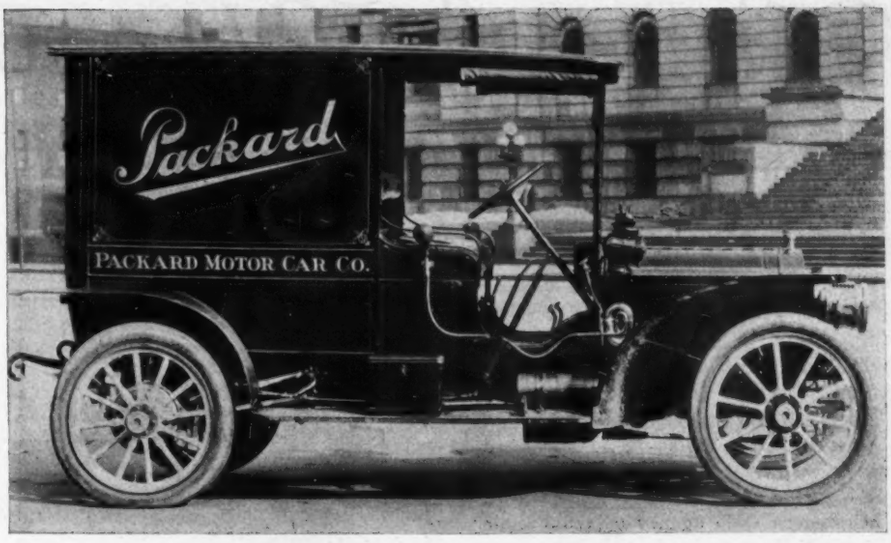
RAMBLER USED BY TRUCK FARMER IN CALIFORNIA

miles per annum. $1,670.00÷12,000=13.25 cents per ton mile. Figuring 13.25 cents the horse trucking cost less 4.67 cents, the motor trucking cost leaves 8.58 cents per ton mile to put in your pocket. These figures are made on a very conservative basis. Forty miles a day for the Morgan truck is not excessive. In fact it has to its credit 80 to 100 miles a day, and on one run made 146 miles in 13 hours, under load. In brief, figuring in close detail, as follows: $.0858 cents multiplied by 200 ton miles per day, totals $17.16 per day. Multiply this total by 300 working days and the result gives the yearly saving, over and above horse trucking cost, of $5,148.00.

"Another instance and illustration of the utility of a truck is where a truck averaged to make from 550 miles to 800 miles per month, and did so consistently for 4 months with hardly a stop for repairs, transporting from 4,500 to 7,000 pounds daily a distance of 40 to 60 miles, making a saving of from $3 to $5 per day over prices charged for railroad transportation, to say nothing of the prompt delivery through the day. This is an instance where the motor truck actually took the place of five two-horse teams, for if horses had been used for this work, day in and day out, for 3 weeks, doing the work of the truck, not a horse would have had a leg left under him."

SERVICE OF COMMERCIAL RIGS

The question is often asked: "How long will a motor truck stay in active commission?" and examples of what some trucks have done, show that a good truck is capable of much longer service than ordinarily would be suspected. The Packard Motor Car Co., of Detroit, Mich., uses its own 3-ton truck exclusively in its local hauling. The Packard company's No. 4 truck was put into service in 1907. It has been actually in service 522 days, during which it has covered 16,489 miles. Its principal work has been in hauling express and freight between the Packard factory and the different railway freight depots.

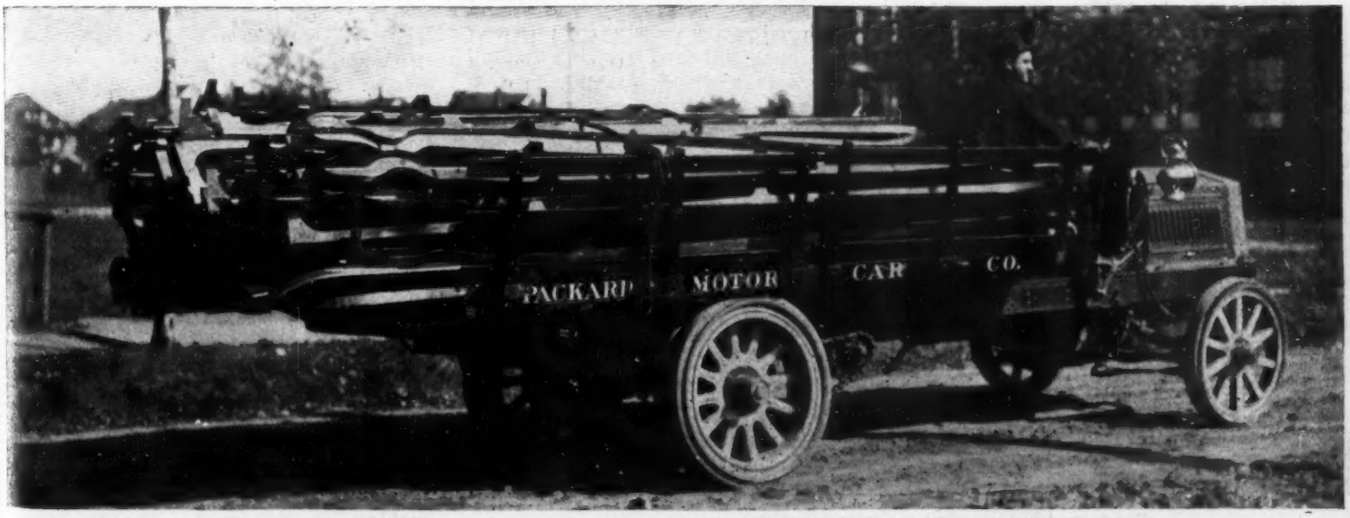


PACKARD THIRTY DOING DUTY AS LIGHT DELIVERY RIG

The truck, in the time it has been in use, has made 1,373 trips and has hauled 7,833,022 pounds of freight, or, approximately, 4,000 tons. Its tonnage per day has been 15,006 pounds and its average tonnage per trip, 5,705 pounds. The gasoline consumed in these 522 days of work has been 3,548 gallons, or an average of 4.64 miles per gallon. The truck has just been put into the shop for repainting and overhauling, and, as soon as this is accomplished, will be placed again in the regular service. The Packard factory being about 4 miles from the business center of Detroit, the company employs a special delivery car for carrying the mail back and forth and for other special trips where prompt service is desirable. This car is a 1907 Packard Thirty experimental car, which first went on to the road March 10, 1906. As an experimental car the executives of the company and members of the engineering department drove the car 55,000 miles. In April, 1908, it was equipped with a light delivery body and has since been the special delivery car. On this service it has done active work 252 days, and has covered 17,742 miles, making 1,509 trips and an average per day of 70.4 miles. Thus, between its road service and its later work as a light delivery wagon, this car has made about 73,000 miles and will be continued in its present capacity.

IN FARMING SERVICE

Along the San Fernando road, near Los Angeles, Cal., people who get up at daylight frequently see a large commercial motor vehicle rolling smoothly along with a ton of boxes and crates piled high on the body. In these boxes and crates are celery, apples, beets, onions, potatoes, lettuce, cabbage and cauliflower. This truck is a Rambler chassis with a special interchangeable body built in Los Angeles. J. Q. Adams, of Eagle Rock, has adopted this method of making his morning deliveries of garden produce in that section. This market gardener had been using three wagons to transport his merchandise, but found that in muddy weather there was a great loss of time on the road. The car is making good and carries three ordinary wagon loads of produce at a faster rate than a horse-drawn vehicle could make a single trip with one-third of the load.



PACKARD 3-TON TRUCK THAT HAS COVERED NEARLY 17,000 MILES

Among the Makers and Dealers

Apperson in Pittsburg—Wainwright & Bratton have secured the agency for the Apperson cars.

A Packard Equipment—The announcement is made by the Truffault-Hartford people that their shock absorbers will be part of the equipment of each 1910 Packard.

More Lines for Velie—A. A. Atwood, of the Atwood Automobile Co., of Toledo, has closed a deal whereby he takes the northwestern Ohio agency of the Premier and the Velie.

Coil Maker Quits—The Oshkosh Electric Co., Oshkosh, Wis., manufacturer of spark coils, has discontinued business and disposed of its machinery, tools and material and has wound up its affairs.

In New Place—The Kunkel-Kelley Motor Car Co., which is general distributing agent in western Pennsylvania for the Overland, is now located in its new garage on Baum street, Pittsburg.

Temme Handling Carbureters—J. A. Temme, formerly with the Auto Equipment Co. of Philadelphia has been appointed manager of the Boston branch of the Stromberg Motor Devices Co.

Kissel Plant Busy—The plant of the Kissel Motor Car Co., Hartford, Wis., which was recently enlarged to treble its former size, is working night and day gangs on an estimated production of 1,200 cars.

Will Handle Strombergs—R. Combs, of St. Louis, has been appointed distributer for the Stromberg carburetor in St. Louis and vicinity. Mr. Combs is St. Louis representative of the Duro battery and also Prest-o-Lite tanks.

Increases Its Capital—The Reliable-Dayton Motor Car Co. of Chicago, manufacturing motor buggies and delivery wagons, has completed a recapitalization, increasing the capital from $25,000 to $200,000, fully paid in. The Reliable-Dayton company was incorporated under the laws of Illinois in 1907 and is in its third business year.

Moving to Indianapolis—Since March 1 the American Distributing Co. has moved its headquarters from Cleveland to 207 West South street, Indianapolis, Ind., from which point it will continue to act as exclusive sales manager for the following concerns: The Westinghouse Electric and Mfg. Co., of Pittsburg, Pa.; Hayes Wheel Co., Jackson, Mich.; Lewis Spring and Axle Co., Jackson, Mich.; Jackson Drop Forging Co., Jackson, Mich.; American Gear and Mfg. Co., Indianapolis, Ind.; Elyria Machine Parts Co., Elyria, O.; Kinsler-Bennett Co., Hartford, Conn.; Sparks-Withington Co., Jackson, Mich.

STODDARD-DAYTON'S NEW YORK HOME

New Lozier Agents—The following agencies have recently been let by the Lozier company: Willard V. B. Campbell, Horicon, Wis.; Franklin Motor Car Co., Franklin, Pa.; Samuel A. Esswein, 24 West Broad street, Columbus, Ohio.

Will Stay in Denver—The Fritchle Automobile and Battery Co. denies that it intends moving its factory from Denver to Indianapolis, although it is not at all improbable that it may establish an eastern plant as an auxiliary to the one in Denver.

Englishman Sales Manager—McDonald Purcell, until recently with the Napier makers in England, has just taken a position as sales manager with the Indiana Carriage and Automobile Co., Indianapolis, agent for the Jackson, Regal and Leader.

Change of Name—The Auto-Car Equipment Co. of Buffalo has changed its name to the Auto-Car Mfg. Co. and increased its capital stock to $250,000. The company will move into its new buildings at Elmwood and Hartel avenues May 1. The plant will be one of the most complete in construction and equipment and will have a capacity for an output of about 1,000 commercial rigs per year.

Kent Retires—Morgan B. Kent, who had the agency in Boston for the Stearns and Hotchkiss cars, has resigned both agencies and has gone on a visit to his old home in northern New York. There are a number of people seeking the Stearns agency, but the matter has not been settled.

Duluth Man in Omaha—Arthur R. Smith, formerly of Duluth, Minn., will have charge of the Drummond garage at 2024 Farnam street, Omaha, and will devote his entire attention to the Woods electric and Stanley steamer, for which W. R. Drummond is the Omaha agent.

Orders Japanese Manganese—A contract has just been closed by the Rock Island Battery Co., of Cincinnati, for the entire output of a Japanese manganese mine. This, it is claimed, is the first time in the history of dry cell manufacture in America that the Russian ore has been displaced.

Interstate Incorporates—The Interstate Automobile Co., which has just erected a large factory at Muncie, has been incorporated under the Indiana laws, with $300,000 capital stock. Directors named in the articles of incorporation are T. H. Hart, J. M. Maring, F. C. Ball, E. B. Ball and T. F. Rose.

Howlett with Jones—Harry S. Howlett has assumed charge of the Jones speedometer office in Boston. Manager Howlett will promote the Jones' interests throughout the New England territory. He formerly was engaged with the Diamond Rubber Co. and more recently with the Fisk Rubber Co.'s Boston branch.

Signs Connolly—C. J. Connolly, for many years a leading bicycle and motor car agent in Rochester, N. Y., and later on the traveling force of the Motor Car Equipment Co., has joined forces with the Mutual Auto Association Co. of New York city, and will cover his old territory with a new extensive line of accessories.

One More in Detroit—Ground has been broken near the corner of Woodward avenue and Brady street, Detroit, for the new garage of Postal & Doherty, who are distributers for the White and Oakland cars in Detroit. Construction will proceed rapidly, the firm having won a legal fight from a neighbor who attempted to bar the way under the plea that the new building would be a nuisance. A deal has also been completed for a Woodward avenue establishment for the Detroit Oldsmobile

branch. This will be constructed at Woodward avenue and Sproat street. The building, which will be erected by R. H. Fyfe, is to represent an investment of $20,000.

Bristol Company Growing—The Bristol Engineering Co., engaged in the manufacture of taxicabs and the Allen-Kingston motor car has leased a brick factory building on North Main street, Bristol, Conn. The concern was organized last season and operations commenced in October.

Slowed a Bit By Fire—Temporarily, the Jones speedometer is without an office in Hartford, Conn. On February 25 fire rendered its branch at 284 Trumbull street, in that city, uninhabitable for the time being, and pending repairs the New York city headquarters of the Jones speedometer will take care of the Connecticult trade.

Another Baltimore Garage—The latest garage planned for Baltimore will be erected at 1917 and 1919 North Charles street by Dixon C. Walker, who has just taken on the local agency for the Studebaker. Mr. Walker was formerly one of the best known horse dealers in this state, but has recently turned his attention to motoring.

Rockwell Convalescing — Samuel P. Rockwell, who was seriously injured by being thrown from a car at Pittsburg last October, where he was employed as sales agent for the White company's branch in that city, expects to be able to take up his new position very shortly, as assistant to Walter C. White, of the White Co., Cleveland, O.

Brittons Take on American—R. D. and C. O. Britton, of Hartford, Conn., have added the American roadster to their line, now comprising the Maxwell and the Stoddard-Dayton. This is the first time that the western car has been represented in Hartford. The Brittons inaugurated a taxicab line a short time ago and so successful has the venture proved that four more vehicles have been put into service.

Moon Lecture Course—In order to broaden the sphere of practical motor car knowledge among its employes the Moon Motor Car Co., of St. Louis, is arranging a lecture course on practical motor car construction for their benefit exclusively. President Joseph W. Moon believes that instead of the machinist understanding only the making of the particular part or parts to which he is assigned, that he should have a comprehensive knowledge of the construction of the entire car. After the luncheon hour the men will frequently be given lectures on the principles of different parts of car-making, and the practical side of it as illustrated by the Moon, in the construction of which each man is an essential factor. At night is planned to give occasional illustrated lectures, using the stereopticon. Authorities on different parts of motor car technique will be called upon to give these instructive lectures. Stewart McDonald, general manager, will talk to the employes on various topics.

Stoddard Plant Growing—Extensive additions to the Bainbridge street plant of the Dayton Motor Car Co., at Dayton, O., will soon be under way. A transformer will be erected by the Dayton Lighting Co. on a temporary platform in the street to furnish the company power while the work is proceeding. It is planned to complete the new addition within 90 days.

Gets Larger Plant—The Hartford Auto Parts Co., of Hartford, Conn., has moved into larger quarters. It has taken a lease of the west wing of the Colt's patent fire arms factory at 80 Huyshope avenue, which will give it nearly four times as much space as it formerly occupied. The company confines itself to the manufacture of universal joints.

New Stoddard Store—The Atlantic Motor Car Co., the Stoddard-Dayton representative in New York city, having outgrown its quarters at the corner of Fifty-seventh street and Broadway, is about to move into a new building next door which has a frontage of 50 feet on Fifty-seventh street and a depth of 100 feet. It is to be eight floors above the street level. A large basement will be used as a repair shop by the Atlantic company. A large stock of extra parts will be carried for the purpose of supplying the eastern trade.

Increasing Mitchell Plant—The Mitchell Motor Car Co., of Racine, Wis., has obtained options on a tract of 21 acres adjoining its present extensive plant at Racine Junction, Wis., and it will erect additions to cost $300,000, increasing the capacity approximately 25 per cent. The cost of the site is said to be $3,000 per acre. The Mitchell company has for the last year been forced to work its employes from 2 to 4 hours overtime to keep up with orders, but since the New York and Chicago shows a night shift has been employed in many departments.

Hardy's Perpetual Guarantee—The R. E. Hardy Co. commenced in January to place a perpetual guarantee on Sta-Rite plugs; agreeing to make its plugs as good as new at any time when returned to the factory in New York city. This already has had the result of plugs being returned, which have been used almost continuously 4 or 5 years.

Recovers from Fire—The J. W. Bowman Co., Boston representative of the Stevens-Duryea, is once more back in the old quarters on Boylston street, that were burned out a short time ago. The salesrooms have been entirely renovated and Mr. Bowman has made a number of changes in the general appearance of the place so that it is better than ever.

Gibson Plant Grows—Work has been started on a two-story building at 235 North Pennsylvania street, Indianapolis, for the Gibson Automobile Co., which will cost $10,000. It will be a brick structure, with a solid plate glass front. The new building will be in the rear of the one now occupied in Massachusetts avenue. Both will be retained, the new one to be used as a sales and display room. The company represents the Premier, Ford, Marion and Reo.

Premier Increases Capacity—Because of the unexpected demand for cars this year, the Premier Motor Mfg. Co., of Indianapolis, has been obliged to increase its manufacturing facilities. About 20,000 square feet of space in the Industrial building has been leased for the paint and finishing assembling rooms until an addition for these departments can be built. An additional assembling room 40 by 120 feet is to be built and the company also has completed a large addition to its motor-testing room.

INLAND AUTO CO.'S STORE AT WALLA WALLA, WASH.

Brief Business Announcements

Hartford, Conn.—Alexander Smith, with a garage at 35 Mulberry street, has taken the local agency for the Regal.

Sodus, N. Y.—The Pullman-Field Co. is about to erect a garage. Work will be begun on the building very soon.

New York—The Monarch Motor Co. has bought the Metropolitan garage at Seventy-seventh street and Broadway.

Manitowoc, Wis.—Hall Brothers have leased the former roller skating rink here and will convert it into salesrooms and garage.

Philadelphia, Pa.—Samuel Levy has been appointed manager of the Philadelphia Rubber Tire Co., with offices at 680 North Broad street.

Baltimore, Md.—The Firestone Tire and Rubber Company has placed a distributing agency with R. Milton Norris, 516-18 West Baltimore street.

Manitowoc, Wis.—The Buerstatte Bicycle Co. has been sold to Frank Planksi, of Milwaukee, a repairman, who will make the motor car line a feature.

Bellevue, Pa.—A garage is being erected here by the Bellevue Automobile and Repair Co., Ltd. The building is a fireproof structure of 6,000 feet of floor space.

Providence. R. . I.—The Hitchcock-Banks Co., agent for the Knox car, is now located in temporary quarters with the Thomas & Lowe Machinery Co.

Carlsbad, N. M.—The Roswell Auto Co., of Roswell, N. M., has built a garage and machine shop. The new firm will be known as the Carlsbad Auto Co.

Philadelphia, Pa.—Application will be made for a charter for the Gregg Carriage Co., which will manufacture and deal in carriages, motor cars and vehicles of all kinds.

Pittsburg, Pa.—F. W. Fisher, of 115 South Beatty street, has been appointed agent for the Marmon and Jewel. C. G. McCormick is to act as sales manager for the Jewel car.

Providence, R. I.—Edward A. Dauer, formerly with the Dauer Automobile Co., on Richmond street, has gone into business for himself, and will act as agent for the Mora.

Los Angeles, Cal.—The Big Four Automobile Co, which has been composed of C. E Anthony and W. R. Woolwine, has been dissolved. Mr. Woolwine has left the firm, and in the future the business will be continued by Mr. Anthony. It is the intention of Mr. Woolwine to form a new company, to be known as the Woolwine Automobile Co., which will act as agent for the Marmon. Quarters have been secured at 1100 South Olive street. Mr. Anthony will continue the Big Four company, but will take up a new line of cars.

Milwaukee, Wis.—The Riverview Automobile Co., which has received an appointment as state agent for the Moon line, will occupy its new garage at 325 East North avenue about April 1.

Pittsburg, Pa.—Application will shortly be made for a charter for the Pittsburg Auto Equipment Co., which will manufacture and deal in motor cars, bicycles, tires, equipments and accessories.

Boston, Mass.—The Charles River garage, of this city, has been incorporated with a capital stock of $150,000. W. M. Wood is the president of the company and A. R. Lewis treasurer.

New Haven, Conn.—The Todd Rubber Co. has opened a repair shop and general accessory salesroom at 20 Church street, at the old location of Edward T. Barton, who recently went into bankruptcy.

Sterling, Ill.—The Western Illinois Motor Co., which has garages at Morrison and Prophetstown, has opened a new place here, locating at 408 Locust street. Roy Baer has been installed as manager.

Marshfield, Wis.—Prominent lumbermen and capitalists of Marshfield, the center of the hardwood industry of Wisconsin, are getting together on the proposition of building a big factory for the manufacture of bodies and hardwood specialties for motor cars. W. D. Connor, former lieutenant-governor, and W. H. Upham, ex-governor, living at Marshfield, are said to be interested.

Viroqua, Wis.—Knudson Brothers have been appointed agents for the International high-wheel line in a few western Wisconsin counties. The agency will be handled from the Knudson implement establishment.

Milwaukee, Wis.—The William F. Mueller garage, Farwell avenue and Brady street, Milwaukee, has been opened. It is being devoted mainly to public use. W. F. Mueller will superintend the repair department personally.

Menominee, Mich.—The Poyer garage will be formally opened on April 1. It is one of the most beautiful in the country, the front being constructed of massive sandstone and ornamental cut stone, embellished with art pieces.

Denver, Colo.—C. S. Newsom has been appointed agent in this city for the White, and will establish headquarters at Fifteenth street and Cleveland place. This is the first agency ever maintained in this city by the White company.

Pittsburg, Pa.—Application will shortly be made for a charter for a corporation to be known as the McGraw-Burgess Vertical Fabric Tire Co., which will manufacture and deal in motor car tires, tubes, lugs, patches and rubber goods of all kinds.

Minneapolis, Minn.—Two new cars have entered the Minneapolis field, the Pullman, which will be handled by the Victoria Motor Car Co., agent already for the American Locomotive and the Meteor, which will be handled by John A. Hedlund.

Watertown, Wis.—The Tuschen garage at 211-213 North Third street was formally opened last week. On May 1 the Tuschen brothers will entertain the children of Watertown by driving them about the city and into the country, where a lunch will be spread.

Kansas City, Mo.—A new company has commenced business at 1727 Grand avenue. It is the Western Rubber and Supply Co., and will act as agent for the Firestone tire. W. E. Fouse, of this city, and W. F. O'Neill, now of Akron, O., are the members of the firm.

Waynesboro, Ga.—A company has been organized with a capital stock of $10,000, to operate a motor bus line between Waynesboro and Girard. Charles Brigham is the president; W. R. Buxton, vice-president; W. V. Stephens, secretary and treasurer, and J. B. Heath, general manager of the company. The cars will be put in operation shortly.

RECENT INCORPORATIONS

Arlington, Mass.—Arlington Auto Co., capital stock $25,000, will do a general motor car business; incorporators, H. M. Gott, W. E. Duncanson.

Council Bluffs, Ia.—Atlantic Automobile Co., capital stock $25,000; incorporators, C. L. Herring, J. G. Herring, and B. A. Spinney.

Glen Cove, N. Y.—Red Spring Garage Co., capital stock $25,000, to operate a machine shop; incorporators, E. R. Weeks, H. L. Underhill, G. E. Hawkins.

Wilmington, Del.—Motor Service Co., capital stock $300,000; incorporators, F. M. Shive, S. E. Robertson, H. W. Davis.

San Antonio, Tex.—San Antonio Taxicab and Auto Co., capital stock $25,000; to operate a taxicab service in this city; Otto Limburger is the president; T. E. George, vice-president, and T. Vanlandingham, general manager.

Homer, Mich.—Homer Auto Truck Co., capital stock $12,500, to manufacture motor trucks, drays, delivery wagons and gasoline engines. The names of the incorporators are not given.

Brooklyn, N. Y.—Bushwick Livery and Garage, capital stock $5,000, to maintain a garage and stable; incorporators, Sam Brown, H. A. Leschinsky, Louis Lipscitz.

Brooklyn, N. Y.—Ambulance Auto Co., capital stock $2,000, to make and sell motor cars; incorporators, W. H. Douglas, G. C. Holmes, and Faith Holmes.